





FRONTISPIECE.—The spot-breasted woodpecker, carpintero pechipunteado (*Chrysomitris punctigula striatigularis* Chapman), rare in Panamá, known from a few records in mangroves in the eastern Province of Panamá and Darién (see page 533). Painting by Walter Weber.

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THE BIRDS OF THE REPUBLIC OF PANAMÁ

Part 2.—Columbidae (Pigeons) to
Picidae (Woodpeckers)

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THE BIRDS OF THE REPUBLIC OF PANAMÁ PART 2: COLUMBIDAE (PIGEONS) TO PICIDAE (WOODPECKERS)

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INTRODUCTION

THE FIRST section of this account of the avifauna of the Isthmus of Panamá, published December 27, 1965, covered the 202 species in the 35 families from the Tinamidae (Tinamous) to the Rynchopidae (Skimmers). The 18 families in this second part include 208 species in the groups remaining in the systematic sequence to the great order of the Passeriformes, the perching birds. As in the first part, the individual accounts include a summary of what is known of each species, based on personal observation and on the published records of others. A further season of field work, from January to March 1966, covered the Burica Peninsula in southwestern Chiriquí, an area not visited previously, and one from which little was known of its natural history. It was fortunate that the visit came at that time as forest cover there was being cleared rapidly for agriculture.

Introductory paragraphs in the first volume outline briefly the physical features of the Republic so these are not repeated here, except to note that with continued change in access to more remote areas, clearing of forests proceeds with a rapidity alarming in its steady pressure in restriction of the native fauna and flora. In this connection it is a pleasure to record the establishment of the National Park and Biological Reserve of Cerro Campana, an interesting region that marks the southern boundary of the mountain flora and fauna of the highlands of western Panamá. With this important beginning it is hoped that other areas also may be set aside for the preservation of their natural features.

Of equal interest and value is the action of the Ministerio de Agricultura, Comercio e Industrias in its Decree No. 23 of January 30, 1967, which establishes protective measures for the conservation of the native fauna, with provision for the establishment of a National Commission concerned with these important matters.

To repeat in part detail included in the introduction of the first volume, the account of each family begins with a brief general statement, followed by a key to identify the species known in Panamá, intended in the main to be used with specimens in hand. Arrangement in these keys is based on restrictive characters, and in its order is not intended to indicate relationship. The lineal order that the families follow is that in my last revision of the *Classification for the Birds of the World* (Smithsonian Misc. Coll., vol. 139, no. 11, June 23, 1960, pp. 1-37). References to literature cited throughout the text, given in parentheses, are condensed but are sufficiently complete for consultation if required.

The account for each species begins with the scientific name, its reference, and vernacular names in English and in Spanish. These are followed by a brief sentence on outstanding characters that may assist in recognition. Where two or more subspecies are found in Panamá, general information that applies to all is covered following a species heading. The subspecies follow, each with its scientific name and reference, a statement of the characters that separate it from its fellows, measurements, range in the Republic, and other pertinent data. If the nominate race is included among these, reference to the scientific name is given under it. Where this form does not reach Panamá the species heading carries this reference. In variable species of wide range, where only one race is found, the information is given under that single heading. Vernacular names, both in English and Spanish, apply to the species as a whole, not to any one subspecies if more than one is present. Much thought has been given to vernacular names, particularly those that have been long in use in standard works that cover the Isthmus. This in some cases has involved choice since in wide-ranging species some populations that have been regarded as distinct, so that each has had its separate vernacular name, now are called geographic races. In the case of migrants from the north the names used are those of the official A.O.U. Check-list (*Check-list of North American Birds*, fifth edition, 1957). With others, especially with tropical residents of wide distribution, names in some have varied so that choice has been necessary. Attempt has been made to select the name most often, or most widely, used as the one appropriate. In this the names suggested by Eugene Eisenmann in his *Species of Middle American Birds* (Trans. Linn. Soc. New York, vol. 7, 1955), and the more recent work by R. M. de Schauensee, *Species of Birds of South America and Their Distribution* (Acad. Nat. Sci. Philadelphia, 1966) have been helpful and valuable.

With the Spanish names, where the bird is one known to Pana-

manian countrymen there is no difficulty. But the great majority of smaller birds are not so recognized. With wide-ranging species through the American tropics, often appropriate names are available from other Spanish-speaking countries. With some of obscure habit it has been necessary to propose names in both languages.

The line drawings that accompany the text, made by the competent hand of Walter A. Weber, have been planned to illustrate type forms in the various families.

Usage in scientific names follows the *International Code of Zoological Nomenclature*, print of 1964, which includes amendments made at the XVIth International Congress of Zoology, held at Washington in 1963.

ACKNOWLEDGMENTS

In the preparation of the present volume, in addition to the extensive collections now in the U. S. National Museum, record specimens have been examined in the American Museum of Natural History, the Museum of Comparative Zoology, the Field Museum of Natural History, the Royal Ontario Museum of Zoology, and the British Museum (Natural History). Other important material has been received on loan from the Carnegie Museum.

The close and friendly association that I have had throughout the years of my work in the Republic with the Museo Nacional of Panamá and its Director, Dr. Alejandro Méndez Pereira, and with the staff of the Gorgas Memorial Laboratory and its Director, Dr. Martin Young, has been of continued value. More recently there has been similar contact with Dr. Horace Loftin, head of the Florida State University Center for Tropical Studies, with headquarters in the Canal Zone.

Government authorities of the Republic of Panamá have continued assistance in numerous ways. I have again to thank General de Brigada Bolívar E. Vallarino, Comandante Jefe de la Guardia Nacional, for permits that allowed continuance of work in the field in the seasons of 1965 and 1966. These two years have given especially valuable data for the present volume. In 1966 officials of the Chiriqui Land Company at Puerto Armuelles aided in providing living quarters and in other ways during work in the area of the Burica Peninsula.

Major assistance in the continued sharing of data of mutual interest has come especially from Dr. Eugene Eisenmann in New York, and from Dr. Pedro Galindo in Panamá. Many pleasant memories remain with me of my contacts with the friendly and courteous residents of the Republic as I have traveled and lived in their country.

Order COLUMBIFORMES

Family COLUMBIDAE: Pigeons and Doves; Palomas y Tortolitas

Members of this family, found widely throughout the temperate and tropical regions of the world, are absent only in the Arctic and Antarctic. Their greatest abundance in number of species is in the broad area between India and Australia. Pigeons vary in size from large to tiny, but all are heavy-bodied birds with small heads and short legs. Many are resident, though often such species shift about seasonally, moving to regions where seeds or berries are locally attractive. Some, as the races of mourning dove of northern North America, leave the northern third of the breeding range to move south, some even into the Tropical Zone. In the tropics of the Indo-Malayan region and the Pacific Islands species of this family with plumage variegated with green, orange, and red are frequent. Those found in Panamá are plain in color. The 23 species recorded on the Isthmus include several that are regarded as game and are sought for sport and for food.

KEY TO SPECIES OF COLUMBIDAE

1. Tail feathers narrow, slender, graduated in length, pointed at the end.
Mourning dove, *Zenaidura macroura*, p. 21
- Tail feathers broad, only slightly graduated, not pointed at the end..... 2
2. A prominent white band on the wing.
White-winged dove, *Zenaida asiatica australis*, p. 18
- No prominent white band on the wing..... 3
3. Smaller, wing less than 120 mm..... 4
- Larger, wing more than 130 mm..... 7
4. Tip of outer primary distinctly narrowed..... 5
- Tip of outer primary not distinctly narrowed..... 6
5. Under tail coverts white or buffy white.
Maroon-chested ground-dove, *Claravis mondetoura mondetoura*, p. 35
- Under tail coverts gray (males), or cinnamon-brown (females).
Blue ground-dove, *Claravis pretiosa*, p. 33
6. Under wing coverts cinnamon-brown, without black; smaller.
Plain-breasted ground-dove, *Columbina minuta elacodes*, p. 30
- Under wing coverts partly cinnamon-brown, partly black; larger.
Ruddy ground-dove, *Columbina talpacoti*, p. 26
7. Outer primary decidedly narrowed at tip..... 15
- Outer primary not abruptly narrowed at tip..... 8
8. Middle toe and claw longer than tarsus..... 9
- Middle toe and claw equal to tarsus, or shorter..... 18

9. Entire crown clear white.
White-crowned pigeon, *Columba leucocephala*, p. 6
Without white in the crown..... 10
10. A prominent white band across the hindneck.
Band-tailed pigeon, *Columba fasciata crissalis*, p. 9
No white band on hindneck..... 11
11. Feathers of breast, neck, and upper back light-colored, tipped on sides and ends with slate or slaty black. ... Scaled pigeon, *Columba speciosa*, p. 11
Breast, neck, and upper back uniform without squamate markings..... 12
12. Crown and hindneck gray, distinctly different in color from back.
Pale-vented pigeon, *Columba cayennensis pallidicrissalis*, p. 7
Crown and hindneck nearly or completely uniform in color with back... 13
13. Back, rump, wings, and tail darker; sooty brown.
Short-billed pigeon, *Columba nigrirostris*, p. 13
Upper surface from crown to upper tail coverts paler, nearly uniform warm brown..... Ruddy pigeon, *Columba subvinacea*, p. 15
15. Crown and hindneck uniform dark gray..... 16
Crown and hindneck brown, or if partly gray this color paler, and restricted to crown, with hindneck brown..... 17
16. Back warm brown..... Brown-backed dove, *Leptotila batteni*, p. 42
Back olive-brown... Gray-headed dove, *Leptotila plumbeiceps notius*, p. 40
17. Under surface paler; breast vinaceous white; under tail coverts white.
White-fronted dove, *Leptotila verreauxi verreauxi*, p. 37
Under surface darker; breast gray or partly gray, under tail coverts with outer webs gray or dusky..... Cassin's dove, *Leptotila cassinii*, p. 44
18. Under surface of primaries partly, or wholly, cinnamon-brown (in some juvenile birds the brown reduced to a narrow outer line)..... 19
Under surface of primaries dark gray..... 21
19. Upper back with a prominent patch of violet; lower breast and abdomen white. Violaceous quail-dove, *Geotrygon violacea albiventer*, p. 57
No violet patch on upper back; breast gray, cinnamon-brown, or buff; abdomen buff to cream-buff..... 20
20. Breast dark gray; a prominent white band below the eye.
Olive-backed quail-dove, *Geotrygon veraguensis*, p. 49
Breast cinnamon-brown or buffy brown; band below eye, where present, buff.
Ruddy quail-dove, *Geotrygon montana montana*, p. 58
21. Crown and hindneck dark russet-brown.
Goldman's quail-dove, *Geotrygon goldmani*, p. 53
Crown and hindneck gray or greenish gray..... 22
22. Breast, sides and abdomen brown.
Chiriquí quail-dove, *Geotrygon chiriquensis*, p. 60
Breast gray, sides brownish gray, abdomen white or buffy white..... 23
23. Forehead white... Lawrence's quail-dove, *Geotrygon lawrencii lawrencii*, p. 51
Forehead buff..... Costa Rican quail-dove, *Geotrygon costaricensis*, p. 55

COLUMBA LEUCOCEPHALA Linnaeus: White-crowned Pigeon;
Paloma Cabeciblanca

FIGURE 1

Columba leucocephala Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 164. (Bahama Islands.)

A dark-colored pigeon, with pure white crown.

Description.—Length 330-350 mm. Male, crown white; nape dark maroon; hindneck bronze-green, with the feathers margined with black; rest of upper surface slate color, with primaries blacker; neck, upper breast, and under wing coverts slate color, changing to slate-gray on the rest of the under surface.

Female, similar to male, but somewhat lighter and duller in color; crown usually brownish gray.

Iris white or creamy white; bare space around eye white with a mixture of pink; base of bill dull red; tip greenish white to brownish white; tarsus and toes crimson; claws brown (Lowe, Ibis, 1909, pp. 332-333).

Measurements.—Males (10 from Panamá, Cuba, and Haiti), wing 189-200 (194.3), tail 115.3-123.4 (120.4), culmen 15-20 (16.9), tarsus 23.5-28.0 (25.8) mm.

Females (10 from Panamá, Swan Island, Cuba, Jamaica, and Haiti), wing 183-203 (189.6), tail 114.4-124.6 (118.7), culmen 15.8-18.8 (17.3), tarsus 25.1-29.6 (26.6) mm.

Fairly common locally on the coast of northwestern Bocas del Toro; Isla Escudo de Veraguas; Big Zapatilla Cay; Swan Cay.

These handsome pigeons are regular in occurrence on the outer shores of the Laguna de Chiriquí, mainly in mangroves and in the forest growth on higher ground immediately behind the swamps. Griscom (Amer. Mus. Nov., no. 293, 1928, pp. 1-2) published the first record of this species for Panamá from a bird taken by R. R. Benson in Bocas del Toro. F. H. Kennard collected a male near Almirante, February 25, 1926 (Kennard and Peters, Proc. Boston Soc. Nat. Hist., vol. 38, 1928, p. 447). A male in the University of California at Los Angeles was taken on Isla Escudo de Veraguas by Frank Richardson, March 3, 1936. I saw 2 on this island on March 1, 1958, and C. O. Handley, Jr., also recorded several during his work there in March 1962. I collected a male in the mangroves at the mouth of Banana River on February 6, 1958. Handley and Greenwell shot a female on Big Zapatilla Cay on the outer boundary of the Laguna de Chiriquí on February 6, 1963.

In 1958 fishermen who lived at Boca del Drago told me that they

were familiar with these birds, which they called "baldpate pigeons," but, in common with other residents of the area, were interested in the fact that, though they saw these pigeons regularly, they had never found a nest. The species, one of wide distribution through the West Indies, moves across broad stretches of open sea outside the breeding season, so it is possible that it comes to the coast of Bocas del Toro only as a wanderer.

The first specimen taken by Benson was an immature female, fully grown, with gray crown, but with fully developed wings in which the primaries are somewhat worn, marked "Almirante, Sapodilly Cay" (Zapatilla Cays), September 11, 1927. A second taken by Benson from Cocoplum, November 2, 1927, is younger, with remnants of the



FIGURE 1.—White-crowned pigeon, paloma cabeciblanca, *Columba leucocephala*.

first plumage and brownish gray crown. The wings also are fully grown and strong. Both may have come from a nesting ground elsewhere. The male that I collected at Banana River had the gonads much reduced.

In flight, or at a distance, these birds appear black, with an occasional flash of white from the crown.

In the West Indies their frail nests of twigs are placed in bushes and trees, and in some localities in mangroves. The glossy white eggs number 1 or 2 to a set. Size is variable, the average of a series being 36.8×27.0 mm., with variation in form from elliptical to long elliptical.

COLUMBA CAYENNENSIS PALLIDICRISSA Chubb: Pale-vented Pigeon; Torcaza Común

Columba pallidicrissa Chubb, Ibis, ser. 9, vol. 4, January 1910, p. 60. (Costa Rica.)

A medium-sized pigeon with reddish brown chest; grayish white on rest of under surface.

Description.—Length 295-335 mm. Male, forehead and anterior crown drab-purple; occiput and nape gray, glossed with bronze and metallic green; hindneck, upper back, scapulars, and smaller wing coverts reddish brown, washed more or less with gray; greater wing coverts and inner secondaries grayish brown; alula, primaries, and outer secondaries fuscous, edged narrowly with grayish white; lower back, rump, and upper tail coverts neutral gray; tail brownish gray; throat grayish white; side of head and upper foreneck gray; breast reddish brown, washed more or less with purple, these colors in some specimens extending to the flanks and abdomen; lower abdomen (usually), flanks, and under tail coverts grayish white to pale gray; axillars and under wing coverts bluish gray.

Female, coloration duller, with reddish brown of upper and lower surface usually less extensive.

Immature, much duller colored; crown gray, or brownish gray; hindneck without metallic gloss.

Adult females in full plumage, taken at Isla Cébaco, March 27, 1962, and at Aguadulce, Coclé, January 18, 1963, had the iris from orange to reddish orange; bare skin around eye dark to bluish neutral gray; edge of eyelids, and a line above and below, reddish brown; bill black; tarsus and toes dull red; claws black.

Measurements.—Males (12 from Panamá), wing 179-192 (184.3), tail 104.5-116.7 (110.9), culmen 15.3-20.0 (17.7), tarsus 24.2-28.7 (26.8) mm.

Females (7 from Panamá), wing 173-180 (177.1), tail 102.9-111.0 (105.6), culmen 15.5-18.4 (16.7), tarsus 25.0-27.3 (26.3) mm.

Resident. Common mainly in the lowlands throughout the Republic, ranging regularly to 600 meters elevation in hill country, less commonly to 1,200 meters. Isla Parida; Isla Bolaños; Isla Brincanco; Isla Canal de Afuera; Isla Coiba; Isla Cébaco; Isla Taboga; and throughout the Archipiélago de las Perlas.

The *torcaza*, the common pigeon of its group of species, usually is found in areas broken by clearings, but may be encountered also in heavy forest. Many range in mangrove swamps, and others come about suburban homes where tree growth is abundant. They are seen in small parties of half a dozen, or fewer, in flight high in air, or at rest singly in the sun in tall dead trees. At other times they remain concealed among the leaves of the high forest crown. Except that they come to drink on gravel bars of streams, it is not common to see them on the ground as they feed mainly on drupes borne on leafy shrubs or trees. The flight, swift and direct, ends often on perches concealed

amid leaves. In walking quietly through low forest on many occasions I have had them flush overhead with loudly clapping wings. In high forest, as on Isla Coiba, and in Darién, they may rest in the tops of the tallest trees. Hunters find them wary, to be obtained by careful stalking, or from concealment below dead trees to which they come to rest in afternoon.

During the nesting season, in the first half of the year, their hooting notes *woo-oo-oo woo-tit-woo woo-tit-woo*, in sound like the calls of some owls, are heard regularly from a distance. Males in display soar above the trees or across small openings with stiffly spread wings, sometimes extended straight and flat, and sometimes elevated at an angle above the back. Again, they fly out in a wide circle, stroking the wings well above the back, finally holding them stiffly while they sail. Nests are small, shallow, frail platforms of twigs that hold a single egg. Usually they are placed in tangles of vines a few meters from the ground. On February 19, 1944, I found a nest on Isla San José in the top of a spiny-trunked black palm. The single white egg was broken accidentally. E. A. Goldman collected an egg on Isla Buena-ventura, off Portobelo, Colón, on May 30, 1911, from a nest that was a flimsy platform of slender twigs 6 meters from the ground in a mass of vines. This egg, white with little gloss, subelliptical in form, measures 37.4×26.1 mm. Another egg, obtained by Dr. Pedro Galindo at Almirante, Bocas del Toro, June 2, 1962, is long subelliptical, and measures 37.6×25.6 mm.

One of these pigeons taken by Goldman had the stomach filled with seeds of a *Solanum*, with a few of a *Miconia*. The harder seeds may have been taken as a grinding agent in lieu of gravel.

The race of this pigeon found in Panamá ranges from southeastern México, through Central America, to northern Colombia and northern Venezuela.

COLUMBA FASCIATA CRISSALIS Salvadori: Band-tailed Pigeon;
Torcaza Collareja

Columba crissalis Salvadori, Cat. Birds Brit. Mus., vol. 21, 1893, pp. 245 (in key), 294. (Boquete de Chitra = Chitra, Veraguas.)

A large pigeon with a prominent white band across the hindneck.

Description.—Length 325-360 mm. Adult male, crown purple-drab, side of head grayer; a prominent band of white across the upper hindneck; lower hindneck metallic bronze; upper back and scapulars fuscous; lower back and rump, upper tail coverts, and basal half of tail slightly browner gray; a blackish band across center of tail, with

the distal portion grayish brown; wing coverts and inner secondaries like back, but slightly paler; primary coverts, alula, primaries, and distal secondaries dusky; outermost primaries with a narrow edging of white; throat drab-gray; rest of under parts purple-drab, with the bases of the feathers gray; under tail coverts dull grayish white, tipped lightly with gray; axillars and under wing coverts neutral gray.

Adult female, similar, but slightly duller, and with a narrower white neck band.

Immature, decidedly duller, without the white neck band, or the metallic color on the hindneck.

An adult female, taken near Cerro Punta, Chiriquí, March 5, 1955, had the iris cinnamon; edge of eyelids, space in front of eye, a narrow line encircling the lower eyelid, and a very faint line encircling the upper eyelid, dull rose-red; rest of bare skin around eye neutral gray; bill honey yellow, with the tip of the culmen dusky neutral gray; tarsus and toes bright yellow; claws black.

Another female, shot February 24, 1965, at 2,150 meters on Volcán Barú, Chiriquí, had the iris light red and the bill yellow. In the adult male the iris is reddish brown.

Measurements.—Males (5 from Chiriquí), wing 200-204 (201.8), tail 118.2-127.7 (122.5), culmen 18.8-20.4 (19.6), tarsus 27.3-30.2 (28.8) mm.

Females (6 from Chiriquí), wing 196-207 (200.2), tail 117.8-128.0 (122.1), culmen 18.3-19.5 (18.9), tarsus 26.3-27.6 (26.8) mm.

Resident. Found in high mountains from the Costa Rican boundary east to eastern Veraguas (Chitra).

At the present time (1965) band-tailed pigeons are locally common around Volcán Barú above El Volcán, and from near Cerro Punta to Lérída, Peña Blanca, and Quiel above Boquete. They range mainly above 1,600 meters, descending less often to 1,250 meters. Arcé sent specimens from Veraguas labeled Chitra, Boquete de Chitra, Calovévora, and Calobre, but there are no modern reports from that area.

In March I have found them in small bands above Cerro Punta, where at times they are not especially wild, though frequently difficult of approach because of the steepness of the hill slopes. They often perch in the tops of tall dead trees in pasture lands. Rarely, I have seen them near the Río Chiriquí Viejo near Palo Santo. The white band on the neck in adult birds is a prominent mark in flight.

The species is one of the recognized game birds of the area, known among Americans as the "band-tail," while in Spanish it is usually lumped with other large pigeons as a *torcaza*.

There is no record of the breeding of this race.

COLUMBA SPECIOSA Gmelin: Scaled Pigeon; Paloma Escamosa**FIGURE 2**

Columba speciosa Gmelin, Syst. Nat., vol. 1, pt. 2, 1789, p. 783. (Cayenne.)

A large pigeon, with dark neck heavily spotted with white.

Description.—Length 290-340 mm. Male, crown and nape dark reddish brown; hindneck and upper back black glossed with metallic green, each feather with a triangular light spot, white on the hindneck, changing to cinnamon-rufous on the back; rest of upper surface, including wing coverts, chestnut; primaries and secondaries dark grayish brown, narrowly edged with white; tail dull black; chin pale vinaceous; neck and upper breast glossy black, each feather with a spot of white and cinnamon, producing heavy squamations; lower breast and sides varied from white to purple-drab, with the feathers margined with dark brown; abdomen and under tail coverts white, with the feathers tipped narrowly with dusky; under wing coverts and axillars dusky gray, tinged with chestnut toward edge of wing.

Female, back, scapulars, smaller wing coverts and rump dull brown; otherwise like the male but usually whiter below.

Immature, much duller in color.

An adult male, taken at Soná, Veraguas, May 21, 1953, had the iris dull brown; basal half of bill deep red; distal half dull Marguerite yellow at tip, with a pinkish wash toward the base; tarsus and toes purplish gray on the large anterior scutes, dull pinkish red on the posterior face; claws horn color.

An adult female collected at Juan Mina, Canal Zone, January 19, 1955, had the iris dark brown; free margin and line around base on upper and lower eyelid red, rest dull grayish; tip of bill flesh color, rest bright red; tarsus and toes purplish red; claws fuscous.

Measurements.—Males (13 from Panamá), wing 175-186 (180), tail 96.0-112.7 (103.6), culmen 19.8-23.2 (21.2), tarsus 24.7-29.0 (25.9) mm.

Females (5 from Panamá and Colombia), wing 172-186 (177.2), tail 90.0-100.5 (97.6), culmen 18.6-21.9 (19.7), tarsus 25.8-27.0 (26.5) mm.

Resident. Widely distributed in wooded areas from sea level to 1,250 meters in the mountains.

This is a pigeon of open forest that is confined to the mainland, the only insular records being from the Laguna de Chiriquí (Coco Cay). Their normal range is from the higher mangroves inland over the hills where they live in the high tree crown. Wherever found their presence is made known regularly by their guttural calls. Often they are seen

resting on tall stubs that project above the leaves or stand alone at the forest edge. The call, deep in tone, may be rendered as *whoo, whoo whoo, whoo*, the first and last syllables uttered slowly, the two between rather quickly. At times the note is deeper, when it changes to *groo-oo coo, groo-groo*. This is varied by utterances of the guttural roll common to male birds of this genus. They often call from the tree tops on high ridges where they rest in the sun.

Scaled pigeons feed on the drupes of trees and shrubs, which when ripened in quantity may cause the birds to congregate. It is then that

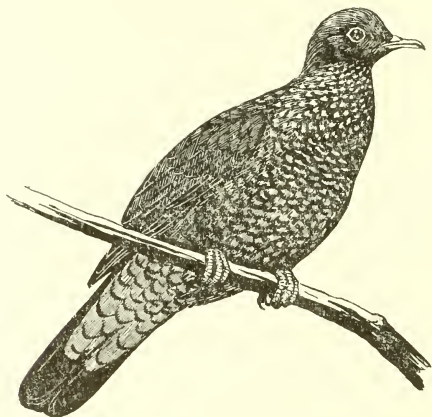


FIGURE 2.—Scaled pigeon, paloma escamosa, *Columba speciosa*.

they figure as game and many are killed. American hunters usually call them "speckle-necks" or "dominicks" from their spotted plumage, the latter name suggested by the resemblance of these markings to those of the Dominique fowl.

At Mandinga, San Blas, numbers slept in the swampy woodlands near the bay, and in early morning flew inland in small bands.

At El General, in southwestern Costa Rica, Skutch (Wilson Bull., 1964, pp. 212-213) described the nests as flimsy platforms of sticks and dry plant materials, placed in second-growth thickets from 2 to 5 meters above the ground, with 1 at about 60 centimeters, and 2 elevated from 15 to 18 meters. Those that were accessible held either 1 egg or a single nestling. Belcher and Smooker (Ibis, 1936, p. 1) described 2 nests in Trinidad with 2 eggs each. These were "slightly

pointed ovals, smooth-shelled, and somewhat glossy." One set measured 39×29.9 , and 39.6×29.8 mm., the other 37.4×29.1 and 40×29.8 mm. A single egg in the British Museum, collected near Remedios, Antioquia, by T. K. Salmon, is white, with the surface faintly granular. It is long elliptical in form, and measures 37.5×26.5 mm. Another from the Demerara River, about 130 miles south of Georgetown, Guyana, collected November 2, 1935 by T. A. W. Davies, is white, glossy, and smooth, and measures 35.3×27.3 mm. The nest from which the latter egg was taken was described as a rough platform of twigs with a few dead leaves for lining, about 200 mm. in diameter. It was placed well hidden by leaves in a tall shrub about $4\frac{1}{2}$ meters from the ground. Russell (A.O.U. Orn. Monogr., no. 1, 1964, p. 71) recorded 2 nests found by Peck in British Honduras, each with 1 egg. In Panamá I have taken adults in breeding condition from January to March, and have found young on the wing (at Soná, Veraguas) in late May.

COLUMBA NIGRIROSTRIS Sclater: Short-billed Pigeon;
Tres-pesos-son

FIGURE 3

Columba nigrirostris P. L. Sclater, Proc. Zool. Soc. London, vol. 27, 1859 (February 1860), p. 390. (Oaxaca, México.)

Oenoenas chiriquensis Ridgway, Proc. Biol. Soc. Washington, vol. 28, June 29, 1915, p. 139. (Chiriquí, Panamá.)

Similar to the ruddy pigeon, *Columba subvinacea*, but with back, rump, and tail fuscous-brown.

Description.—Length 265-285 mm. Adult (sexes alike), crown purplish drab, paler and brighter on the forehead, changing to a brighter brown on hindneck; back, wings, rump, and tail dull drab to fuscous-brown; upper back glossed slightly with purplish brown; under surface, including base of underside of tail, light brownish drab to true vinaceous-drab, paler on the throat, and with the front and sides of the neck washed with purplish brown; under wing coverts pinkish brown; inner webs of primaries and secondaries pinkish brown, becoming dull brownish gray at tips.

Juvenile, head, neck, and under parts reddish brown, darker on the head, brighter on the abdomen; wing coverts tipped with rusty brown.

An adult male, gonads enlarged, collected near the Peluca Hydrographic Station, Panamá, February 19, 1961, had the iris pale dull red; rim of eyelids, and bare skin above, below, and in front of eye dull dark red; bill black; cere reddish black (the red tint barely percepti-

ble); tarsus and toes dark red; claws fuscous. Another male, gonads small (past breeding), from Puerto Armuelles, Chiriquí, February 15, 1966, had the iris brownish orange; cere fuscous; groove on mandibular rami slate; rest of bill dull black; tarsus and toes pinkish red; claws slate-gray.

An adult female (past breeding), taken at the same time, had the iris yellowish orange; bare skin around eye, including rim of eyelids, dull red, except lower eyelid which was greenish slate; cere and grooved side of mandible slate; rest of bill black; tarsus and toes pinkish red; claws slate-gray.

Measurements.—Males (10 from Panamá), wing 151-160 (156.1), tail 101.7-109.4 (104.5), culmen 12.7-14.5 (13.7), tarsus 20.5-23.7 (21.8) mm.

Females (8 from Costa Rica and Panamá), wing 150-167 (158.8), tail 101.3-109.2 (105.1), culmen 12.8-14.8 (13.6), tarsus 20.7-22.8 (21.8) mm.

Resident. Common on the Caribbean slope from Bocas del Toro (Almirante, Cricamola) to San Blas (Mandinga, Puerto Obaldía), and in the valley of the Río Chagres (Piña, Barro Colorado Island) and its tributaries (Peluca, on the Río Boquerón; Candelaria, on the Río Pequení); less numerous on the western half of the Pacific slope in western Chiriquí (Divalá, Bugaba, formerly; Santa Clara, 1,450 meters; El Volcán, 1,350 meters), and Veraguas (Soná); common in eastern Panamá (Utivé, Cerro Chucantí, Charco del Toro), less abundant to eastern Darién (Cerro Sapo, El Real, Cerro Pirre, Cerro Malí at 1,450 meters.)

In the account of the ruddy pigeon which follows I have outlined briefly its similarity to the present species. The short-billed pigeon is found in forest, where in the main it ranges amid the concealment of the heavy leaf cover in the high tree crown, its presence known usually from the calls of males.

The note, *oh-whit-mo-gó*, is easily imitated, so that I have answered it on many occasions when one was near at hand. Usually the bird is difficult to see, though occasionally the vocalist has come down low in the branches to peer at me. The male also utters a guttural *groo-oo-oo* at intervals. In mountain areas they may continue to call when fog comes to cover the forest. Countrymen render the song as *tres pesos son* (sometimes varied to *tres pesos debo*.)

An egg collected by Dr. Pedro Galindo at Almirante, Bocas del Toro, June 2, 1962, which is plain white, and measures 36.3×24.7 mm., is the first recorded for this species, so far as I am aware.

With a good series of *C. nigrirostris* now available from Panamá, it is evident that the pigeon listed currently as *Columba chiriquensis* (Ridgway), known only from the type, is an individual of the present bird. The indistinct barring on the hindneck, one of the supposed differences, is found in several specimens of *nigrirostris* that I have examined, and probably is an indication of immaturity. The purplish cast on the dorsal surface of the type of *chiriquensis* also is duplicated, and the wing measurement of 155 mm. is that of this species.



FIGURE 3.—Short-billed pigeon, tres-pesos-son, *Columba nigrirostris*.

The range of *Columba nigrirostris* extends to northern Chocó in Colombia, where I have specimen records for Acandí and the head of Río Cutí on the eastern slope of the Serranía del Darién, below the eastern end of Cerro Malí. To the north this species ranges through Central America to southern Veracruz.

**COLUMBA SUBVINACEA (Lawrence): Ruddy Pigeon;
Paloma Rojiza**

A medium-sized pigeon, with back, wing coverts, and rump ruddy brown.

Description.—Length 280-310 mm. Adult male, crown and hind-

neck vinaceous or purplish brown, changing to bay or chocolate on the back; wing coverts, rump, and tail slightly duller; primaries and secondaries dusky brown; throat dull fawn color; neck and upper breast slightly paler than crown; lower breast, abdomen, and sides vinaceous-drab; under tail coverts slightly darker, tipped indistinctly with cinnamon; under wing coverts cinnamon-drab.

Adult female, like the male but with colors duller.

Juvenile, in general duller than the adult female; browner above, with the wing coverts margined with cinnamon; crown, rump, and upper tail coverts tipped with darker cinnamon; under parts with duller tips of brown.

This interesting bird and the short-billed pigeon are so similar in form and general color pattern that it is difficult to distinguish them in life. Both are inhabitants of forests where they live high above the ground, hidden among the leaves, so that they are seen only on careful observation. And then only the colors of the lower surface, in which the two are closely similar, may be visible. The close similarity extends also to the calls, though those of the ruddy pigeon when heard clearly are somewhat harsher and more strongly accented.

In my experience, the ruddy pigeon is not especially wary, even on those few occasions when I have found one or two on the ground, walking along open forest trails. They come down also to drink at small forest streams. More often days have passed without sight of one, though scattered birds called steadily from high overhead.

Their small size when in the hand is a surprise as the body is slight in bulk, though in life the long tail makes them appear large.

The typical form is a bird of the Subtropical Zone in the mountains of Costa Rica and western Panamá. Several additional pigeons found in the region from eastern Panamá, Colombia, and Venezuela, south to eastern Bolivia and northern Brazil are accepted currently as subspecies, though there may be question as to this relationship. One of these, in addition to the nominate race, is found in Panamá.

COLUMBA SUBVINACEA SUBVINACEA (Lawrence)

Chloroenas subvinacea Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 9, April 1868, p. 135. (Dota, Costa Rica.)

Characters.—Somewhat brighter brown on the back; larger.

An adult female, taken on the Silla de Cerro Pando, above El Volcán, Chiriquí, March 5, 1954, had the iris hazel-brown; bill dull black; cere dusky neutral gray; margin of eyelids dull red; tarsus and

toes dull rose-red; claws black; under surface of toes dull brownish white. An adult male, shot at the same time, was similar. In another female, taken in the same area, February 7, 1965, the iris was vinaceous-brown, of a shade identical with the color of the crown feathers; somewhat thickened rim of the eyelids brownish red; bill and cere black.

Measurements.—Males (7 from Chiriquí), wing 160-169 (165.1), tail 110.0-120.3 (114.4), culmen 14.0-16.5 (14.9), tarsus 22.0-24.2 (23.4) mm.

Females (4 from Chiriquí) wing 161-165 (163.6), tail 112.5-120.0 (116.1), culmen 13.0-16.0 (14.4), tarsus 21.8-22.9 (22.3) mm.

Resident. Found locally in the Subtropical Zone of the western mountains at elevations from 1,300 to 2,300 meters, from the Costa Rican boundary east on the Pacific slope to Veraguas (Calovévora, Chitra).

I have noted them especially in the mountains near El Volcán, on Cerro Pando, and from there west toward Costa Rica.

Hellmayr and Conover (Cat. Birds Amer., pt. 1, no. 1, 1942, p. 463) remark that "two birds from Chiriquí are slightly redder above than a Costa Rican series." In the fair number that I have examined there is no appreciable difference.

The call, heard often in the forests of Cerro Pando, in general is similar to that of *Columba nigristrois*, but is higher in tone, and definitely more rapid in utterance, with the final syllables slurred by speed so that they are less clear cut.

COLUMBA SUBVINACEA BERLEPSCHI Hartert

Columba subvinacea berlepschi Hartert, Nov. Zool., vol. 5, December 31, 1898, p. 504. (Paramba, 1,060 meters elevation, Río Mira, northwestern Ecuador.)

Characters.—Duller brown above; smaller.

An adult female taken at Boca de Paya, Darién, February 22, 1959, had the iris wine color; edge of eyelids and posterior lores dull red; bill black; tarsus and toes dark red; claws dusky neutral gray. A male, collected near Puerto Obaldía, San Blas, was similar except that the claws were black.

Measurements.—Males (5 from San Blas and Darién), wing 149-153 (151), tail 100-116.2 (106.9), culmen 11.5-13.2 (12.6), tarsus 20.0-22.8 (21.5) mm.

Females (2 from Darién), wing 148 (in both); tail 102, 103.6; culmen 12.8, 13.6; tarsus 20.4, 21.3 mm.

Resident. Eastern Darién in the Tuirá-Chucunaque Valley (to 900

meters at Laguna on the base of Cerro Malí); and eastern San Blas (Puerto Obaldía).

In Darién, Festa collected a specimen at Punta de Sabana on the lower Tuira in August 1895, I secured 1 at Boca de Paya on February 22, 1959, Richardson shot 3 on the Río Tacarcuna below Cerro Malí on March 3 and April 14, 1915, and Galindo has forwarded 1 taken at La Laguna on the same mountain on June 3, 1963. Above Puerto Obaldía on March 18, 1963, I shot 2 from a small flock that came to trees above a gravel bar in a small forest quebrada, evidently to drink.

While *berlepschi* in color is closely similar to *Columba s. subvinacea*, it differs decidedly in size. At Pucro, Darién, in February 1964, I heard a dove calling in high forest that I was not able to shoot, but that I believed to have been *berlepschi*. The note was a plaintive *whoo-oo-a hoo hoo*, a soft call, different from my recollection of the strongly accented song of *subvinacea*. It seems probable that *berlepschi* may prove to be specifically distinct. It ranges from eastern Darién and San Blas through western Colombia into western Ecuador.

**ZENAIDA ASIATICA AUSTRALIS (Peters): White-winged Dove;
Paloma Aliblanca**

Melopelia asiatica australis Peters, Auk, vol. 30, no. 3, July 3, 1913, p. 372. (Cerro Santa María, Guanacaste, Costa Rica.)

Of medium size, with a prominent white band on the wing.

Description.—Length 275-290 mm.; 12 rectrices. Adult male, crown and hindneck purple-drab to dark fawn color, with the forehead grayer; back, scapulars, wing coverts, and inner secondaries light to dark buffy brown; upper tail coverts and middle tail feathers similar; distal wing coverts mainly white, forming a broad, conspicuous streak from the bend of the wing to the end of the greater coverts; alula, primary coverts, primaries and distal secondaries black, the primaries edged narrowly with white, and the secondaries tipped with white; rectrices, except central pair, gray above, except for a black sub-terminal band and broad tip of white; central pair grayish brown; sides of head, neck, and upper breast wood brown, the throat paler; sides of neck glossed with reddish or greenish bronze; a suborbital spot of black; lower breast, sides, under wing coverts, abdomen, and under tail coverts gray.

Female, similar, but usually somewhat duller colored.

Immature, grayer than adults, with no metallic gloss on neck.

Males taken near Puerto Aguadulce in January and March had the

iris orange; bare skin around eye and on lores bright blue; bill black; tarsus and toes light to dark red; claws dull brown to dull black.

Measurements.—Males (8 from Herrera and Coclé), wing 151-160 (156), tail 99.8-112 (103.6), culmen 19.2-20.4 (19.6), tarsus 24.5-27.5 (26.1) mm.

Females (2 from Coclé), wing 148, 152; tail 94.2, 101.4; culmen 19.5, 19.9; tarsus 25.5, 26.2 mm.

Resident. Fairly common in the mangrove swamps around the shores of Golfo de Parita, from the lower Río Parita (Monagrillo), Herrera, to the Río Pocrí and the Río Antón, Coclé.

The white-winged dove was reported first for Panamá by Griscom (Amer. Mus. Nov., no. 280, 1927, p. 1) from 2 specimens collected by R. R. Benson near Aguadulce, on September 25 and 26, 1925. The next record was on February 25, 1948, when W. M. Perrygo and I found several near the lower course of the Río Parita, below Monagrillo, and secured a male. Others were seen March 11, in the mangroves at Alvina, near the mouth of the Río Santa María below París, but it did not occur to me that this was a usual haunt in Panamá. The species is one which I had known in other regions, and at one time I made a considerable study of it in the semidesert country in southwestern Arizona. With this background of information, I made extended search for white-winged doves in areas in Coclé and Veraguas similar to those where I had known the bird in the north, but with no success. Finally, at the close of the 1962 field season, chance took me early one morning to Puerto Aguadulce, and here these doves were calling steadily from the mangroves bordering the Río Pocrí. In the single day available I located a number, and secured 1 specimen. The following season in January 1963, I returned for 10 days to make detailed studies, and secured additional birds for skins.

The local population of this species in Panamá, as stated in the outline of range, lives in the extensive mangrove swamps on the lower courses of the rivers that drain into the Golfo de Parita, where to date I have found them from the Río Parita at Monagrillo, north along the gulf to the mouth of the Río Antón. The largest concentration is along the Río Pocrí from Puerto Aguadulce downstream toward the sea. They fly out from these haunts to feed in open lands adjacent, particularly around fields of corn, beans, and rice, when the crop has been harvested, and then return to the mangroves, a habitat completely different from the mesquite thickets and open woodlands that are the haunts of the species elsewhere.

Below Puerto Aguadulce a dozen may be heard calling in a distance

of half a mile, but the birds are so shy that it takes careful stalking over the mud terrain beneath the tall mangroves to see one. They remain among the leaves in the tree crown, cooing at intervals, but usually take alarm and fly with clapping wings before they may be located in this cover. The usual call, *whoo hoó hoó-ah*, may be varied to a longer series of phrases, *whoo hoó hoó-ah how hoo-ah whoo*. Fishermen here call them *paloma de la marea*, as they believe that the birds coo mainly during the period when the tide is changing. Though I saw no nests at the end of January, I was told of nestlings that had been taken recently to be reared in captivity.

Hunting them was a slow operation and little rewarding until I located a small open area called Isleta, raised a meter or so above the level of the swamp, where corn and beans had been planted and in due course harvested. Here the doves came to feed on waste grain, and by baiting I was able in two visits to secure the specimens that I needed, in addition to the few taken in the heavy swamps. Occasionally I had a glimpse of one or two in flight through the lower open country, but never far from the mangroves. They are hunted for game to some extent, mainly around old fields like those at La Isleta.

The race *australis* was described by Peters from 8 specimens from the Province of Guanacaste on the Pacific slope of Costa Rica, including 6 from the upland areas of Miravalles and Tenorio near the Volcán Miravalles, 1 from Cerro Santa María, and 1 from Bolsón, on the lower course of the Río Tempisque. The series from Panamá differs in grayer coloration on the dorsal surface and breast from Costa Rican birds, which are brighter, browner above, and slightly brighter colored on the breast. The brown coloration is especially evident on the central tail feathers. Dr. George B. Saunders of the Fish and Wildlife Service, who has been engaged for several years in a detailed study of the white-winged dove, will include in his report now ready for publication a description of the bird of Panamá as a distinct subspecies. Until this name is available I have listed the form under the name *australis*.

Ridgway (U.S. Nat. Mus. Bull. 50, pt. 7, 1916, p. 380) mentioned a specimen of white-winged dove in the Carnegie Museum, labeled Natá, Coclé, May 20, 1889, collected by the Rev. Th. Heyde and Ernesto Lux. He noted that this bird "is evidently referable to the larger, grayer form" from farther north. The specimen is similar to the population of parts of Guatemala where these missionaries also traveled, so that it is considered another of their specimens that has been wrongly labeled as to locality.

The nest and eggs of the race of Panamá to date have not been

described. Fishermen at Puerto Aguadulce told me that the young, 2 in number, were taken often to be raised as household pets.

ZENAIDURA MACROURA (Linnaeus): Mourning Dove;
Paloma Rabiaguda

FIGURE 4

Columba macroura Linnaeus, Syst. Nat., ed. 10, 1758, p. 164. (Cuba.)

A grayish brown dove, with elongated, pointed tail.

Description.—Length 265-300 mm.; 14 rectrices. Adult male, fore-part of crown fawn brown, changing to gray at center and over nape; side of head and upper neck deeper brown; back grayish brown; rump gray; upper tail coverts brownish gray; lesser and middle wing coverts brownish gray with browner edgings; greater wing coverts and outer secondaries gray; primaries fuscous, edged narrowly with white; elongated central tail feathers like upper tail coverts; others gray, banded centrally with black, tipped broadly with white except for the two adjacent to the central pair; throat buffy white; sides of neck and breast fawn color; a small spot behind auricular region black, glossed faintly with blue; hindneck and side of neck glossed with bronze and metallic purple; breast, sides, and abdomen pinkish buff.

Adult female, similar but duller colored.

Immature, duller, more grayish brown; feathers of anterior part of body and wing coverts with paler tips.

The mourning dove, of local distribution, is found on the open lands of pastures and savannas, where it feeds on the ground, or rests in the open tops of dead trees or on wires. It flushes with a flash of the black and white markings of the tail, and flies swiftly with whistling wings.

The food is entirely seeds, in large part the many wild varieties, but the mourning dove comes also with other pigeons to glean waste grains in ricefields after the harvest.

The birds found in Panamá include a resident subspecies of small size, and two others migrant from the north, that here are near the southern limits of the winter range. In the measurements of the forms that follow, the tail length is omitted, as unreliable due to wear.

Goodwin (Auk, 1958, pp. 330-334) has united the genus *Zenaidura* with *Zenaida* after a survey of all the species concerned. I prefer the arrangement of Peters (Condor, 1934, pp. 213-215) where *Zenaidura* and its allies with 14 rectrices are separated from *Zenaida* with 12.

It may be noted also that *Nesopelia* of the Galápagos Islands in addition to its different form of the bill has the frontal area of the skull greatly narrowed and the lachrymal reduced compared to *Zenaida*.

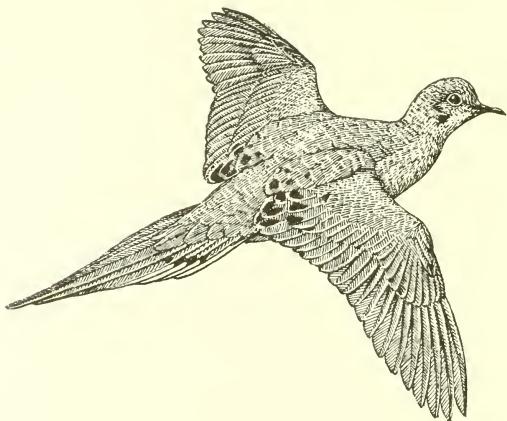


FIGURE 4.—Mourning dove, paloma rabiaguda, *Zenaidura macroura*.

ZENAIIDURA MACROURA TURTURILLA Wetmore

Zenaidura macroura turturilla Wetmore, Proc. Biol. Soc. Washington, vol. 69, September 12, 1956, p. 123. (El Espino, Provincia de Panamá, Panamá.)

Characters.—Generally similar in pale color to *Z. m. marginella*, but smaller in size.

A female taken at Puerto Aguadulce, Coclé, March 11, 1962, had the iris dark brown; bare skin around eye and on lores dark neutral gray; bill black; tarsus and toes dull red; claws black.

Measurements.—Males (6 from Panamá), wing 135.2-139.9 (137.3), culmen 13.5-14.0 (13.9, average of 4), tarsus 20.3-22.3 (21.2) mm.

Females (3 from Panamá), wing 124.7-129.7 (127.0), culmen 13.1-13.3 (13.2, average of 2), tarsus 18.9-21.5 (20.2) mm.

Resident. Locally common in the tropical lowlands of the Pacific slope from western Chiriquí (base of Volcán de Chiriquí) through southern Veraguas (Soná, Santiago, San Francisco, Calobre) and Coclé (Puerto Aguadulce, Penonomé, Antón) to western Provincia de Panamá (El Espino, Playa Coronado, base of Cerro Chame).

Early reports of mourning doves in Panamá all were supposed to be of migrants from the north, until Griscom (Bull. Mus. Comp. Zool., vol. 78, 1935, p. 310) published a breeding record for Santiago, Veraguas, based on his personal observations in 1925 (specimen, June 11). At the time this was interpreted as an occurrence of the typical race, *Zenaidura macroura macroura*, which is resident in the Greater Antilles, and is found on the Florida Keys, all localities far to the east.

In my own field work, beginning in 1948, I saw birds occasionally that I believed were migrants, until on April 1, 1951, near El Espino, Panamá, I secured a male with testes about half enlarged that obviously was a resident individual. And in May and June 1953, I was fortunate in finding mourning doves, unquestionably residents, near Soná and Santiago in eastern Veraguas, and in southern Coclé. Following this, at the British Museum (Natural History) in London, I was able to see the older specimens collected by Arcé, and with the addition of these data determined that the bird of Panamá represented a separate race. While *Z. m. macroura* of the Greater Antilles also is of small size it differs in darker color.

The resident doves are not uncommon, but are local in occurrence, and so are not easy to find. It is usual to see single birds or pairs, or, occasionally, where some feeding ground of limited area is attractive, as many as 25 or so may congregate in a flock. In most observations I have found them wary and difficult to approach. Mainly they are birds of the savannas and pastures that spread also into adjacent areas of open tree growth. Old corn, rice, and bean fields after the crop is harvested often are attractive. The nesting period appears to begin in April and to continue through June. Then males may be heard cooing, and are seen flying out in display where they turn in broad circles with stiffly extended wings. Eugene Eisenmann has found them regularly at Playa Coronado. In late March 1955, I found a few along the western base of Cerro Chame, which is near their eastern limit.

While the wing length in the race is equaled by the smallest individuals in the northern subspecies, bulk of body in the resident birds obviously is less. No information is available as to their nesting.

ZENAIDURA MACROURA CAROLINENSIS (Linnaeus)

Columba carolinensis Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 286. (South Carolina.)

Similar in larger size to the other migrant race, *Z. m. marginella*, from which it differs in darker color.

Measurements.—(From Aldrich and Duvall, Condor, 1958, p. 110). Males, wing 136.5-154.0 (144.8), culmen 12.0-14.5 (13.3), tarsus 19.5-23.0 (21.5) mm.

Females, wing 130.5-143.0 (137.9), culmen 12.0-15.0 (12.9), tarsus 19.5-21.5 (20.7) mm.

Migrant from the north. Of casual occurrence; one record.

The only report at present is that of a specimen in the Museum of Comparative Zoology that was shot by W. W. Brown, Jr., at Divalá, Chiriquí, November 11, 1900.

This subspecies breeds in the eastern United States and southeastern Canada, and has been identified as a winter migrant in southern México on several occasions. Farther south there is 1 specimen recorded from Guatemala, and 1 from Nicaragua, in addition to the 1 specimen from western Panamá listed above.

Hellmayr and Conover (Cat. Birds Amer., pt. 1, no. 1, 1942, p. 478) give the date for the bird last mentioned as November 26, which is in error.

ZENAIIDURA MACROURA MARGINELLA (Woodhouse)

Ectopistes marginella Woodhouse, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, no. 3, May-June (Aug. 20), 1852, p. 104. (Cross timbers on the North Fork of the Canadian River, Oklahoma.)

Large in size, like *Z. m. carolinensis*, but distinctly paler in color.

Measurements.—(From Aldrich and Duvall, *loc. cit.*, p. 110). Males, wing 137.0-156.5 (144.3), culmen 12.0-16.5 (13.5), tarsus 19.5-23.5 (21.3) mm.

Females, wing 131.5-154.0 (141.7), culmen 12.0-15.0 (13.5), tarsus 19.5-21.5 (20.5) mm.

Migrant from the north. Found locally in small number on the Pacific slope in western Panamá east to Herrera and Coclé, from November to early April; one record from Bocas del Toro.

The few early reports include specimens taken by Heyde and Lux at Natá, Coclé, January 14, 1890, by W. W. Brown at Divalá, Chiriquí, and by Arcé on the slopes of the volcano, also in Chiriquí. In my own work I have seen birds that I believed to be migrants and probably of this race near Pesé, Herrera, March 30, 1948, above El Espino, Panamá, March 24 and April 1, 1951, and near Alanje, Chiriquí, March 4, 1960. All were difficult to approach, and when flushed flew far away out of sight. Individuals of the resident race while timid are less wild.

I have 1 specimen from Almirante, Bocas del Toro, taken by R.

Hinds, November 7, 1961, to date the only record for the Caribbean side. This is an immature male, not fully in adult dress.

**[ZENAIDURA AURICULATA HYPOLEUCA (Bonaparte):
Eared Dove**

Zenaida hypoleuca Bonaparte, Compt. Rend. Acad. Sci. Paris, vol. 40, no. 3, 1855, p. 97. (Ex America centrali = Guayaquil, Ecuador.)

The type specimen of this race is in the British Museum (Natural History), received in collections made by Captain Henry Kellett and Lieutenant Commander James Wood during the Survey of *H.M.S. Herald* along the western coasts of the Americas (1846-1849). While the bird bears a label on which "Pearl Island" is written, this is in error as the species of dove is not known in Panamá. Though the supposed record has been mentioned by several authors (more recently by Rendahl, Ark. Zool., vol. 13, 1920, pp. 28-29) it is without basis. The specimen is of the race found from Ecuador and Perú south to Bolivia. As the collectors worked at Guayaquil, Ecuador, Zimmer (Field Mus. Nat. Hist., Zool. ser., vol. 17, 1930, p. 257) has designated that place as the type locality. Hellmayr and Conover (Birds Amer., pt. 1, no. 1, 1942, p. 481) cite further details and synonymy, and agree with Zimmer's action.

The form is included here only to point out that it has no place among the birds of Panamá.]

[STREPTOPELIA RISORIA (Linnaeus): Ringed Turtle Dove

Columba risoria Linnaeus, Syst. Nat., ed. 10, vol. 7, 1758, p. 165. (India.)

Lawrence, in an addendum to his account of the birds collected by James McLeannan along the line of the Panama Railroad (Ann. Lyc. Nat. Hist. New York, vol. 8, 1863, pp. 11-12), includes this small dove, known widely in domestication throughout the world, with the following statement: "This species appears to have established itself on the Isthmus in a wild state and found congenial quarters for its increase. Mr. McLeannan writes me that he had heard it 'at two extreme points on the Isthmus, ten miles from the Atlantic and six from any habitation, and also four miles from the Pacific close to a village, and have been told by a gentleman surveying here, who knows the bird well, that he saw them on a stream called the Cabiancho, a tributary of the Gatun.' The specimen sent is in fine condition, with no apparent evidence of having been in confinement."

The species has become naturalized in restricted range in various

localities, as near Los Angeles, California, and Miami, Florida, in the United States. I have not been able to locate the McLeannan specimen mentioned, and there has been no further reference to the bird in the wild in Panamá. The report of its acclimation is believed to have been made through misunderstanding.]

**COLUMBINA TALPACOTI (Temminck); Ruddy Ground-Dove;
Tortolita Colorada**

Columba talpacoti Temminck, in Temminck and Knip, Les Pigeons, Colombi-gallines, 1811, p. 22. (Brazil.)

Small; warm brown in color, with a flash of brighter brown from its wings as it flies.

Description.—Length 155 to 180 mm. Adult male, crown gray to brownish gray, paler on forehead; hindneck more or less vinaceous, changing to cinnamon-brown or darker on rest of upper surface, including wings and central tail feathers; outer web and tip of alula, tips of primaries, and outer tail feathers fuscous-black; scapulars and inner secondaries, with a few oblique bars or spots of black; throat dull white or vinaceous-white; under surface vinaceous-russet, paler and grayer on foreneck and sides of head, deeper rufous-brown on abdomen and under tail coverts; axillars and inner under wing coverts black; outer under wing coverts and under surface of wing cinnamon-brown, the outer wing coverts in some mixed with black.

Adult female, above buffy brown to light olive-brown, grayer on the forehead, with black markings on back as in male; under surface dull buffy gray, with throat and abdomen white; sides and under tail coverts drab-brown.

Immature male, like female, but usually browner.

This species is widely distributed through the Tropical Zone from north-central México, south through Central America, ranging beyond in South America from northern Colombia and Venezuela to eastern Bolivia and northern Argentina. It is found especially in more open areas, so that the drier, less forested sections of Panamá are favorable habitat. But in regions of forest it ranges also back of beaches and along the open playas of larger rivers. It is common at the borders of human settlements, whether isolated Indian villages or the suburban gardens of spreading, modern towns and cities. Wherever clearings are made for pastures or cultivated fields presently these doves appear.

The nominate population *Columbina talpacoti talpacoti*, found from the llanos of southeastern Colombia and the Guianas southward, has the under wing coverts, and most of the under surface of the entire

wing, black. In the several northern subspecies these areas are almost entirely cinnamon, with some mixture of black or dusky only in the under wing coverts and on the tips of the wing feathers. Two geographic races are found in Panamá.

This species and others have been listed currently in a separate genus *Columbigallina* (formerly called *Chamaepelia*). Examination of structural details, including the skeleton, shows no trenchant points of difference from the ground doves of South America of the genus *Columbina*. It seems proper, therefore, to merge these two groups under the older name *Columbina*, as proposed by Goodwin (Auk, 1959, pp. 512-513).

It should be noted that the ruddy ground-doves included in the species *talpacoti* have a narrow line of small feathers on both inner and outer sides of the tarsus. In the *passerina* group of forms, and in *Columbina picui*, this feathering is shorter, and is confined to the inner side of that part of the leg.

COLUMBINA TALPACOTI RUFIPENNIS (Bonaparte)

Chamaepelia rufipennis Bonaparte, Compt. Rend. Acad. Sci. Paris, vol. 40, no. 1, January 1855, p. 22. (Cartagena, Bolívar, Colombia.)

Characters.—Male, darker, duller brown above, especially on the wing coverts; female, somewhat paler, grayer on the lower surface, with the flanks and under tail coverts grayer brown.

An adult male, taken at Guánico Arriba, Los Santos, January 24, 1962, had the iris reddish orange; edge of the eyelids Marguerite yellow; bare skin around eye dull neutral gray; cere and adjacent area of maxilla fuscous-brown; rest of maxilla and tip of mandible dusky neutral gray; basal part of mandible dull greenish gray; gape and posterior half of the border of the mouth faintly honey yellow; tarsus and toes dull light pink; claws dark brown. Another male, collected at Puerto Armuelles, Chiriquí, February 24, 1966, had the iris very pale orange-yellow; edge of eyelids pale dull Marguerite yellow; cere and basal half of maxilla pale dull brown; tip dull slate; tip of mandible dull brown; cutting edge and gape dull buffy brown; mandibular rami pale gray; bare skin between rami light neutral gray; tarsus and toes light pink; claws black.

Measurements.—Males (10 from the mainland of Panamá), wing 84.2-89.2 (86.7), tail 57.5-63.8 (61.0), culmen 12.1-13.4 (12.7), tarsus 17.0-18.0 (17.4) mm.

Females (10 from the mainland of Panamá), wing 82.8-88.2 (85.4),

tail 56.1-61.9 (59.7), culmen 11.5-13.7 (12.5), tarsus 16.5-17.5 (17.1) mm.

Resident. Common throughout the lowlands, except in regions of heavy forest. Appears in forested areas as soon as clearings are made; apparently also is extending upward over mountain slopes with increase in agriculture; Isla Cébaco.

Blake (Fieldiana: Zool., vol. 36, 1958, p. 510) recorded 1 male and 2 females taken by Mönniche at 1,350 meters, near Quiel above Boquete, November 8, 1934, and October 24, 1937. None were collected here by W. W. Brown, Jr., in 1901. On the western slope of the volcano in 1954 and 1955 I found them at 650 meters above Concepción, and on March 20, 1965, I saw 2 at 1,250 meters above the Río Chiriquí Viejo at Palo Santo.

This small dove is seen regularly in early morning in pairs or small flocks on open roadways where they walk quickly with steadily nodding heads, their footprints making a lacy pattern in dusty soil. When approached they stand or crouch motionless, and then rise quickly with a flutter of sound and a flash of brown from the underside of the wings. As the sun warms the cooler air of early morning, little groups fly up to open branches to bask in its pleasant heat. In country sections, particularly on the Pacific side of the Isthmus, their double-noted cooing calls, *coó-ah coó-ah*, are heard in steady, monotonous repetition throughout the day. Where their food of seeds is abundant 50 to 100 or more may congregate.

While there seems to be a principal breeding season from February to May, nesting may begin in late December or early January and continue even as late as the middle of August. As mated pairs walk quickly on open ground the male at intervals makes a quick hop of a few centimeters, with both feet together, that brings him to the side of the female. In other displays he walks with the tail held at an angle above the back, or he may stand briefly, quickly flitting the tips of his wings. Nests are placed in shrubs or low trees, usually from 1 to 6 or 7 meters from the ground. According to observations by Skutch (Condor, 1956, pp. 159-196) the male brings small sticks and straws to the female to arrange for the nest, or, if she is away, places them himself. The usual finished structure is loosely made and often flimsy, with the open cavity shallow. The eggs are white with a faint gloss. The normal set is 2, with 1 found in some instances. A single egg sent to me by Dr. Pedro Galindo, collected at Almirante, Bocas del Toro, April 5, 1962, measures 22.5×16.9 mm. Near El Real, Darién, on January 27, 1964, I found a nest in a rancho built for shelter in a small

ricefield. The 2 fresh-laid eggs rested in a shallow depression on a thin mat of straw and other fine fibers, placed under the edge of the roof thatch about 2 meters above the dirt floor. These eggs measure 22.2×18.3 and 23.5×17.6 mm. In a subsequent visit, on February 17, beside the rancho I found another nest made of a scanty assemblage of straws placed on the top of a small stub a meter tall. This also held 2 eggs that appeared to have been laid recently. The shape of the eggs is between elliptical and subelliptical. Skutch (*loc. cit.*, p. 193) gives measurements of 16 eggs as ranging from $21.8-25.4 \times 15.9-17.9$ mm. He recorded both parents incubating, the female through the night, the male for a shorter period during the day.

Near Pacora these birds were called *Palomita titibúa*.

The considerable series of skins available from Panamá shows the usual range of variation, but on the whole is faintly grayer than an equal number in our collections from northern Colombia. The few examined from the eastern slope of the Azuero Peninsula are especially gray.

COLUMBINA TALPACOTI NESOPHILA (Todd)

Chaemepelia rufipennis nesophila Todd, Ann. Carnegie Mus., vol. 8, May 8, 1913, p. 590. (Isla del Rey, Archipiélago de las Perlas, Panamá.)

Characters.—Male, faintly deeper, brighter brown above, particularly on the wing coverts; female browner on the lower surface, especially on the flanks and under tail coverts.

Measurements.—Males (8 specimens), wing 85.7-89.0 (87.8), tail 57.1-65.6 (62.0), culmen 12.0-13.8 (13.0), tarsus 16.7-18.9 (17.8) mm.

Females (7 specimens), wing 83.0-88.3 (84.7), tail 59.1-64.8 (61.8), culmen 11.4-13.8 (12.6), tarsus 16.4-18.3 (17.2) mm.

Resident. Local in the Archipiélago de las Perlas (specimens seen from San José, Pedro González, Rey and Saboga Islands; sight records presumed to be this race on Chapera and Cañas Islands); Isla Coiba.

It has been interesting to find that these doves from Coiba Island agree in color with those of the Archipiélago de las Perlas, an indication of unity that was unexpected.

On Isla Coiba I found them in little groups in the pastures where the grass was cropped short, or where it grew in scattered tufts on the poorer soils. January 11, 1956, I flushed a female from a nest placed 2 meters from the ground on the top of a recently cut stump,

where it was concealed among tall green sprouts. The nest, made of twigs, was flat, and more firmly built than usual, due probably to the solid foundation on which it rested. The 2 slightly incubated eggs, white with a definite gloss, between elliptical and subelliptical in form, measure 22.0×16.8 and 22.2×16.7 mm. Another nest brought to me the following day by a convict, who had found it in the top of a palm while gathering coconuts, held 2 eggs that were too heavily incubated to be preserved.

These doves were common in pasturelands around the convict camps, in which otherwise the only bird inhabitants were a few tropical kingbirds. Aside from this habitat the doves, in small numbers only, were restricted to the borders of the coastal swamps and open thickets immediately behind the shoreline. Since the pastures had been cleared mainly after the penal colony was established in 1919, it seems evident that the ruddy ground-dove has increased in number through this extension of the area favorable to it.

In the Archipiélago de las Perlas, in 1944, on Isla San José, a few ruddy ground-doves were encountered in fairly open grassy areas near a headland at East Harbor, and in the small open savanna at Bald Hill in the north end of the island. On Pedro González they ranged around small fields. On Chapera and Cañas, I saw them about little water holes in open forest, and in the uninhabited sections that I visited on Isla del Rey a few lived at the back edge of the mangrove swamps, and near beaches where there were small expanses grown with grass.

It is interesting to note that I did not see this species on Isla Taboga during my various visits to that island.

**COLUMBINA MINUTA ELAEODES (Todd): Plain-breasted
Ground-Dove; Tortolita Sabanera**

Chaemepelia minuta elaeodes Todd, Ann. Carnegie Mus., vol. 8, May 8, 1913, p. 578. (Buenos Aires, Costa Rica.)

Smallest of the Panamanian doves; female grayer than the ruddy ground-dove.

Description.—Length 140 to 155 mm. Male, forecrown bluish gray, paler on the forehead; rest of upper surface dark grayish brown, grayer on the hindneck; central tail feathers like back, others gray with a distal black band and grayish white tip; wing coverts usually paler, and somewhat vinaceous; lesser wing coverts, tertials and inner secondaries with a few scattered spots of steel blue; throat vinaceous-white; sides of head and rest of under surface vinaceous-drab, paler on the abdomen; under tail coverts brown, tipped with grayish

white; axillars and under surface of wing cinnamon-brown, with the tips of primaries and secondaries grayish brown.

Female, above like the male, but with the entire crown and hind-neck uniform in color with the back; greater wing coverts edged with white to grayish white; throat and center of abdomen white; rest of under surface drab to grayish drab.

Juvenile, like female, but somewhat more ruddy, with paler tips on the feathers of the breast and upper surface.

An adult male, taken at El Llano, Panamá, February 3, 1962, had the iris dull orange; edge of eyelids light yellow; rest of bare eyelid dark neutral gray; cere, maxilla, and tip of mandible fuscous-brown; base of mandible neutral gray, with base of cutting edge of bill, on both maxilla and mandible, honey yellow; tarsus and toes dull pink; claws black.

Measurements.—Males (10 from Panamá), wing 71.2-76.0 (74.3), tail 44.5-51.8 (48.1), culmen 10.0-11.2 (10.5), tarsus 14.9-16.4 (15.5) mm.

Females (4 from Panamá), wing 72.1-77.0 (74.7), tail 45.2-51.5 (48.4), culmen 10.6-11.8 (10.9) mm.

Resident. Locally common on the Pacific slope from western Chiriquí east to El Llano, Panamá, including the eastern slope of the Azuero Peninsula; recorded inland in Chiriquí to the base of the volcano (Francés, El Banco); and on the Caribbean slope in the Canal Zone, at Mindi, July 11, 1915 (Hallinan, Auk, 1924, p. 310), near Gatun on February 14, 1961 (specimen), and on Barro Colorado Island, March 24, 1950.

This small dove is a bird of open savannas where there is cover of grass and weeds or scattered stands of low bushes. Locally it is common, but is far less numerous than the ruddy ground-dove. Groups of 10 to 15 may congregate where the seeds that form their food are attractive but it is more usual to find them in pairs or alone. As I have crossed open savannas frequently I have had them flush near at hand, dart swiftly away only a meter or two above the ground, and after a short flight drop down again to concealment in the grass. Occasionally they are observed in low bushes that grow in the open. These are the ordinary views of the species as it is less confiding than the larger ground-dove. However, around towns in the open country it may range in the outer areas where the houses are scattered. In Coclé Province I found them on the broad savannas in the lower valley

of the Río Grande as far inland as El Potrero. And in southern Los Santos I recorded them below Pedasí along the lower Río Caldera, and in the open valley at Tonosí. They were common also in the pastures below El Llano, but here must have spread from the natural savannas near Chepo, as the area that they inhabit, now level and open, originally had been covered with heavy forest.

Their food is small seeds. One taken at Corozal, Canal Zone, June 15, 1911, had eaten nearly 300 seeds of the grass *Sporobolus indicus*, with fragments of a few other kinds.

One call of the male resembles the syllables *co way, co way*, uttered rapidly and repeatedly. Another is a low *woo-ah woo-ah woo-ah*. While the tone is similar to that of its larger cousin the form of the syllables is different. Males display by sailing out from low perches for short distances with stiffly spread wings.

Nests may be placed on the ground or in bushes, more rarely in low trees. A brief manuscript note by E. A. Goldman mentions a nest found June 20, 1911, on the ground near Corozal, that was made of grass "interwoven to form a low platform." It held a young bird recently hatched. A broken egg lay outside. The female stood over the young bird and allowed the observer almost to touch her before she fluttered off as though crippled. Major General G. Ralph Meyer gave me a set of 2 eggs taken at Summit, Canal Zone, on June 22, 1941, from a nest platform of twigs placed at a slight elevation above the ground, on a horizontal branch of a grapefruit tree. The 2 eggs, partly incubated, white with a faint gloss, and between elliptical and subelliptical in form, measure 19.8×15.5 and 21.0×15.6 mm. A nest, from which I flushed an adult bird, on the small savanna at Ana Luz near the Río Bayano, below Chepo, April 16, 1949, was merely a slight depression in the top of a low grass tussock, lined with bits of grass stem and a few feathers. The 2 fresh eggs, in color and form like the 2 listed previously, measure 19.4×14.8 and 19.5×15.1 mm. On March 24, 1961, at La Jagua Hunting Club I found a female on a nest 3 meters from the ground in the outer branches of a cashew tree. The male perched nearby. The flimsy platform of dried grass stems was 130 mm. across, with a slight central depression 70 mm. in diameter. The single fresh egg, like the others described, measures 20.7×15.1 mm. (The measurements of $1.08 \times .64$ inches, or 27×16 mm. given by Hallinan, Auk, 1924, p. 310, for an egg from a nest found near Gatun May 26, 1909, are too large for this species.)

**CLARAVIS PRETIOSA (Ferrari-Pérez): Blue Ground-Dove;
Tortolita Azul**

FIGURE 5

Peristera pretiosa Ferrari-Pérez, Proc. U.S. Nat. Mus., vol. 9, October 2, 1886, p. 175. (New name for *Columba cinerea* Temminck, 1811, preoccupied; type locality Brazil.)

A ground-dove of medium size; male gray with dark spots on wings; females olive-brown, with bright brown spots on wings, and light brown tail.

Description.—Length 185-210 mm. Male, bluish gray, with forehead and throat light grayish white, back and wings darker; wing coverts and inner secondaries with a variable number of dark spots; primaries and secondaries black.

Female, above light olive-brown to cinnamon-brown, changing to russet on upper tail coverts and middle tail feathers; wings spotted in variable amount with chestnut; forehead and side of head brownish gray; throat white; forepart of body tawny olive, changing posteriorly on lower breast and sides to pale gray; center of abdomen white; under tail coverts russet, more or less mixed with gray; under wing coverts gray; wings and tail dull black.

Immature, like female, but scapulars and wing coverts tipped with cinnamon; feathers of foreneck and breast with paler margins; wing spots reduced or lacking.

An adult male taken at the Peluca Hydrographic Station, February 17, 1961, had the iris dark orange; bare skin around eye gray (like the gray of the feathers on the center of the crown); line on culmen fuscous; rest of maxilla and anterior half of mandible dull Marguerite yellow; cere and mandibular rami pale greenish gray; bare skin between rami (posterior to gonys) neutral gray; tarsus and toes dull rosy white; claws dusky neutral gray. Another adult male, taken at Guánico Arriba, January 25, 1962, had the iris dark orange-red; bare skin around eye light greenish gray; cere light brownish gray; anterior third of culmen line dark mouse brown; rest of bill dull buffy white; tarsus and toes pale pink; claws black.

A female shot at the Peluca Station, February 26, 1961, had the iris reddish orange; bare skin around eye neutral gray; line of culmen fuscous as in male; cere dull neutral gray; side of maxilla and mandible light yellowish brown; bare skin between mandibular rami greenish neutral gray; tarsus and toes as in male. Another female, from Puerto Armuelles, Chiriquí, January 30, 1966, had the claws black.

Measurements.—Males (12 from Panamá), wing 111.5-116.3 (113.2), tail 64.0-76.0 (69.1), culmen 13.4-15.6 (14.6), tarsus 18.0-20.2 (19.1) mm.

Females (8 from Panamá), wing 106.5-112.4 (109.4), tail 67.0-71.0 (69.2), culmen 13.3-15.1 (14.3), tarsus 17.9-19.3 (18.7) mm.

Resident. Common in the Tropical and lower Subtropical Zones throughout the mainland. Isla Coiba; Isla Cébaco.

These handsome little doves, of shy and retiring habit, are birds that find farmlands where a few trees remain, forest edge along streams, the borders of mangrove swamps, and low growths back of beaches

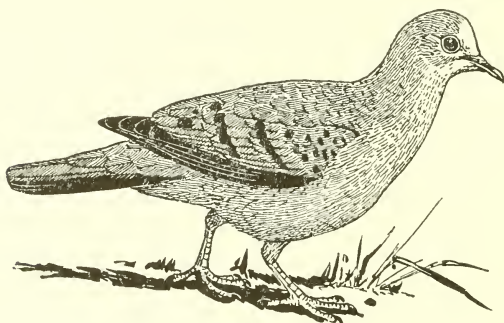


FIGURE 5.—Blue ground-dove, tortolita azul, *Claravis pretiosa*.

and marsh lands attractive haunts. Since much of the time they remain hidden, either in feeding quietly on the ground, or in resting behind the shelter of leaves, their abundance is recognized in the main from the steady calls of the males, that are heard from early morning through the heat of the day. The note, *coo-o*, sometimes slightly accented at the end, *coo-ah*, is uttered with a rising inflection. As it is repeated softly for minutes at a time, it may become so much of a background sound for the more striking calls of other birds that it almost passes unnoticed.

They range often in pairs, and come down briefly to shaded gravel bars to drink and pick up grit, but at any movement fly at once to cover. In early morning they sometimes appear on the ground along less frequented roads. In the San Blas and Darién they are found around the fields of the Indians, which, it may be supposed, have been a favored haunt for ages.

Males in display spread and elevate the tail, droop the wings, and bow, as they move along a horizontal branch, or on the ground. Alexander Skutch (Condor, 1959, pp. 65-74), in an excellent account of the life history of this bird, based mainly on observations in Costa Rica, describes ceremonial feeding of the female by the male. Nests, the loosely made, shallow structures of twigs and dried tendrils usual in doves, are placed in dense cover in thickets or low trees a few meters above the ground. The eggs are white, with 2 as the normal set, though occasional nests contain only 1. Skutch records measurements of 6 eggs as ranging from $25.0\text{-}26.2 \times 17.5\text{-}19.4$ mm. In Panamá the main nesting period appears to come between March and August.

The skin in this species is more delicate and the attachment of feathers even looser than usual in doves, a family in which these traits normally are found, so that the preparation of museum specimens requires much care.

The blue ground-dove has an extensive range from southeastern México through Central America and most of tropical South America to northern Argentina and southern Brazil, including the island of Trinidad. There is some variation in depth of color, particularly in males, but this appears to be individual so that no subspecies are recognized.

In Panamá, as noted in the range above, these birds are common on the islands of Coiba and Cébaco, and also occur on the large islands in the Laguna de Chiriquí, but they have not been found to date in the Pearl Islands. It appears that this species may be less prone to cross wide stretches of open water than is the case with the ruddy ground-dove.

CLARAVIS MONDETOURA MONDETOURA (Bonaparte):
Maroon-chested Ground-Dove; Tortolita Serrana

Peristera mondetoura Bonaparte, Compt. Rend. Acad. Sci. Paris, vol. 42, May 1856, p. 765. (Caracas, Venezuela.)

Claravis mondetoura pulchra Griscom, Occ. Pap. Boston Soc. Nat. Hist., vol. 5, June 14, 1930, p. 288. (Boquete, Chiriquí.)

A ground-dove of medium size; male gray, with reddish brown breast; female olive-brown with two or three dark purple spots on the wing coverts.

Description.—Length 210-230 mm. Male, forehead and throat grayish white; rest of dorsal surface, including central tail feathers, slate-gray, darker on the rump; wing coverts somewhat paler; a broad band of violaceous black on the inner secondaries and the inner greater

coverts, and a smaller one, sometimes absent, on the inner lesser coverts; alula and primaries brownish black; outer tail feathers grayish white to white; foreneck and chest chocolate-brown to deep reddish brown (extended in some back across most of breast) passing into slate-gray on lower breast and sides; abdomen and under tail coverts white; axillars and under wing coverts grayish to blackish brown.

Female, above olive-brown, grayer on the wing coverts; wing spots dark purple; outer tail feathers dull black tipped with white; forehead and malar region cinnamon, changing to dull white on throat; chest buffy brown; abdomen and under tail coverts buff to buffy white.

Immature, like female but browner, with under parts narrowly edged with buff.

An adult male taken above Cerro Punta, Chiriquí, March 8, 1955, had the iris light orange-brown; bare skin around eye Marguerite yellow, with the edge of the eyelids black; bill black; tarsus and toes dull red; claws fuscous.

Weight, ♂, 77 grams.

Measurements.—Males (5 from Chiriquí), wing 108.0-117.0 (112.2), tail 74.5-83.5 (78.3), culmen 12.5-13.7 (13.1), tarsus 20.5-24.5 (22.3) mm.

Females (2 from Chiriquí), wing 110, 114; tail 73.5, 78.0; culmen, 13.5, 15.0; tarsus 21.0, 24.0 mm.

Resident. Uncommon in the Subtropical Zone in western Chiriquí at elevations of from 1,500 to 2,100 meters. One record for Cerro Campana, Western Province of Panamá.

The main reports of this little-known species have been from the region near Boquete, where W. W. Brown, Jr., secured the first specimens recorded from Panamá between January and May 1901 (Bangs, Proc. New England Zool. Club, vol. 3, 1902, p. 23). While Brown indicated that he found them down to about "3,000 feet elevation" I believe that this was in error by at least 1,500 feet (500 meters) from my own observations in that area. Mönniche secured 3 specimens at Lérída, where he recorded the species between 1,600 and 1,950 meters (Blake, Fieldiana: Zool., vol. 36, 1958, p. 510). On the opposite side of the volcano Mrs. Davidson collected a female, the only one seen, at Cerro Punta, January 3, 1931, (Proc. Cal. Acad. Sci., vol. 23, 1938, p. 256). My only personal experience with these birds was in this latter locality in March 1955. Above 2,000 meters elevation there were a few in forest with heavy undergrowth containing much bamboo. The birds were found on the ground, and were seen with difficulty because of the dense cover. We spent some time in careful stalking

before we secured 1 male. It was possible to follow them mainly through their notes, as they were calling *coo-ah'*, *coo-ah'*, uttered with an accented rising inflection, but otherwise similar to the note of the blue ground-dove. As they fly, the white in the tail is prominent. Others were flushed or heard subsequently in other localities in this region. As an additional record, Dr. F. A. Hartman has presented me with a male taken on Cerro Pando, beyond El Volcán, on March 5, 1956.

Several subspecies have been described from Central America, each from a small number of specimens. As more material has become available the supposed differences appear due to individual variation. (For a summary see van Rossem, Trans. San Diego Soc. Nat. Hist., vol. 8, 1934, pp. 5-8.) From present information it appears that the typical form ranges from Costa Rica and Panamá through the mountains of Colombia and Venezuela. The specific name *mondetoura* was given by Prince Bonaparte to honor Madame Pauline Mondétour, widow of the ornithologist Geoffroy Saint-Hilaire.

The egg listed by Nehrkorn (Kat. Eiersamml., 1899, p. 185) from "Span. Honduras. Rothlichweiss. 31.5×23 mm.," from the color and size may have been that of a quail-dove. It appears to be too large for the present species.

Dr. Eugene Eisenmann has brought to my attention a male in the American Museum of Natural History, caught by George V. N. Powell on November 9, 1966, in a mist net on Cerro Campana, an unexpected record.

LEPTOTILA VERREAUXI VERREAUXI (Bonaparte):
White-fronted Dove; Paloma Rabiblanca

FIGURE 6

Leptotila verreauxi Bonaparte, Compt. Rend. Acad. Sci. Paris, vol. 40, 1855, p. 99. (Colombia.)

A dove of medium size, with gray-brown back, pinkish brown crown, light under surface, and tail with broad white tips which show prominently in flight; often seen on open trails and roadsides in early morning.

Description.—Length 250 to 280 mm. Adult male, forehead pale vinaceous, changing to fawn color on superciliary area and auricular region, and to pinkish brown on the crown; occiput hair brown; hind-neck paler, with a metallic gloss of purple to bronze-green; rest of upper parts grayish brown; alula, primary coverts, and primaries dusky; primaries and secondaries with narrow paler edgings; middle

tail feathers like back; others shading to slate on outer pair, black toward the ends, tipped broadly with white; throat white to pinkish white; neck and upper breast grayish vinaceous, pinker on the lower breast and sides, shading to white on abdomen and under tail coverts; axillars, under wing coverts, and under surface of flight feathers dull cinnamon-rufous.

Female, like the male, but usually somewhat duller colored.

Immature, decidedly duller colored, with chest grayish brown, and without metallic sheen on the hindneck; feathers of back, wings, and breast with narrow tips of light brown.

In an adult male taken at El Potrero, Coclé, March 7, 1962, the iris was orange-yellow; bare skin around eye and lores grayish blue;

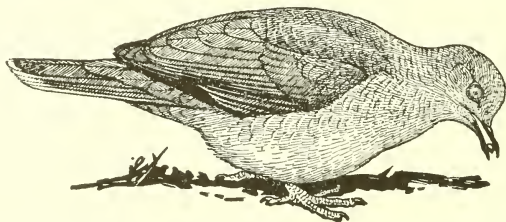


FIGURE 6.—White-fronted dove, Paloma rabiblanca, *Leptotila verreauxi verreauxi*.

bill black; tarsus and toes dull red; claws black. In other adults examined the iris was bright orange. In birds not in breeding condition it may be brownish orange, with the bare skin on the side of the head and the cere dark gray, and the tarsus and toes lighter red.

Measurements.—Males (10 from Panamá) wing 135.2-146.7 (139.5), tail 91.5-103.4 (97.3), culmen 15.5-17.7 (16.7), tarsus 28.5-31.3 (29.8) mm.

Females (9 from Panamá), wing 133.0-142.0 (137.7), culmen 15.7-17.4 (16.3), tarsus 27.0-31.2 (29.1) mm.

Resident. Abundant through the Pacific lowlands from the Costa Rican boundary east to the eastern limits of the Province of Panamá (Majé, El Llano); rare in Darién (El Real). On the Caribbean side, from the Río Indio in western Colón (El Uracillo, Chilar), through the Chagres Valley inland to the Río Boquerón and the Río Pequení, and in eastern Colón (Portobelo) to western San Blas (Mandinga). At present, in western Chiriquí found to 1,400 meters above El Vol-

cán, and to 1,800 meters above Boquete. Isla Parida; Isla Gobernadora; Isla Cébacó; islas Taboga, Taboguilla, and Uravá; Archipiélago de las Perlas (islas San José, Pedro González, Bayoneta, Casaya, Del Rey, Saboga, Contadora, Chaperá, and Santelmo).

This dove has extended its range upward in western Chiriquí as the forest has been cleared. W. W. Brown, Jr., did not find it at Boquete in 1901, nor was it taken earlier by Arcé though now it is present there in some numbers. We have 2 specimens collected by Benson at Quiel above Boquete in November 1931, and Mönniche, following that date, secured them in that area regularly. In 1964, I recorded several and collected 1 near El Real, Darién, so that it may be extending its range in that area also, as it was not reported there earlier. A record of a specimen in 1941 at Garachiné, reported by Bond and De Schauensee (Acad. Nat. Sci. Philadelphia, Monogr. 6, 1944, p. 28), is in doubt, as the label for this bird, a mummy, has the locality marked with a query. It is probable that this dove will spread westward on the Caribbean slope through northern Veraguas, and eastward through the San Blas as the forests are cleared.

The white-fronted dove lives in thickets and more open forest and is universally distributed about farmlands and pastures wherever there is any cover. It thrives especially around fields, and in growths of shrubbery and vines on steep slopes or along small streams, as it is able to shift about without apparent difficulty when parts of its coverts are cleared. In traversing trails through its haunts these birds flush with a rattle of wings and a flash of white from the tail. Often they fly only a short distance and then stop motionless on some low perch, or on the ground, where a practiced eye is required to see them. At sunrise they come out in the open and walk along open trails and roadsides, in savanna country often a hundred meters from shelter. As the steadily advancing sun brings the heat of the day they retreat again to thickets and forest. Near the coast they range regularly in the drier areas back of the mangrove swamps.

The call of the male, a resonant *coo-oo-ah*, comes all day long, a pleasant note repeated at frequent intervals.

Nests are shallow platforms of twigs, lined with a few finer rootlets and weedstems, usually concealed in vines or leaves on a horizontal branch elevated a meter or two. Occasionally I have seen nests on the ground. The 2 eggs in the set, white with a slight gloss, vary from long elliptical to elliptical in shape. Ten eggs from Panamá, 2 from my personal collecting, and the rest presented by Major General G. Ralph Meyer, have the following range in measurement: 26.6-

31.3×20.6-21.3 mm. The dates extend from January to July. It is probable that the birds nest through most of the year.

The *rabiblanca*, sometimes called *titibúa* in imitation of its call, is one of the common game birds of the country that, in spite of steady shooting by those with guns and constant trapping by country boys, seems to hold its own. Like the crested bobwhite, it is often sold alive in markets.

Unless too constantly molested these doves are tame, and often exhibit curiosity. Frequently when I have moved slowly and quietly through thickets I have had one fly toward me and alight near at hand. Suddenly the tip of the tail would be lowered, then brought quickly above the back and spread widely, while the head was nodded. On Isla Taboga I saw these doves repeatedly fly between the trees at Restinga on the main island and the wooded islet of El Morro, a distance of 300 meters or more, wholly in the open. This readiness to fly over water explains their wide distribution among the islands of the Perlas group, and elsewhere along the Pacific Coast.

There is some variation in depth of color in the gray-brown dorsal surface in the considerable series that we have from the entire range in Panamá. The only really aberrant specimen is a male from Isla Parida taken February 2, 1962, that is decidedly darker brown than any other specimen seen.

LEPTOTILA PLUMBEICEPS NOTIUS Peters: Gray-headed Dove; Paloma Cabeciceniza

Leptotila plumbeiceps notius Peters, Bull. Mus. Comp. Zool., vol. 71, February 1931, p. 298. (Almirante, Bocas del Toro, Panamá.)

A medium-sized, ground-inhabiting dove with gray head, olive-brown back, and vinaceous-buff breast.

Description.—Length 235 to 260 mm. Adult male, forehead grayish white to bluish gray, changing to slate-gray on crown and hindneck; rest of upper parts and central tail feathers olive-brown; wing feathers dusky; outermost tail feathers dusky, tipped with white; throat white; side of head, foreneck, and chest deep vinaceous-buff, becoming gray at the sides, and more pinkish on the lower breast; abdomen and upper tail coverts white; sides and flanks light olive-brown; axillars, under wing coverts, and proximal inner webs of remiges cinnamon-rufous.

Female, similar, but duller in color.

In 2 female specimens from near Almirante, Bocas del Toro, February 12, 1958, the iris was dull Marguerite yellow; bare skin of loreal

area dull red; bare eyelids neutral gray; bill and cere black, tarsus and toes dull deep red; claws fuscous.

Measurements.—Males (2 from Bocas del Toro), wing 130.6-131.4 (131.0), tail 87.7-88.2 (87.9), culmen 14.7-15.5 (15.1), tarsus 27.5-29.8 (28.6) mm.

Females (4 from Bocas del Toro), wing 127.2-134.6 (131.1), tail 77.1-82.2 (80.3), culmen 14.3-15.6 (15.2), tarsus 28.2-30.6 (29.7) mm.

Resident. Recorded in western Bocas del Toro near Changuinola, Almirante, and around the shores of Bahía Almirante to Isla de Colón.

Gray-headed doves are far from common, as in 2 months in their haunts I recorded them only twice. On February 12 on Jones Creek, back of the bay shore below Isla Pastores I collected 2 females in an open spot in the forest where a mass of heavy creepers supported by a tree made dense shade that had eliminated most of the usual ground cover. Nearby, a male called from a perch near the ground in low, dense *rastrujo*. The curious, low note, *cwuh-h-h-á* had a reedy quality that in sound suggested the call of the flatbilled motmot (*Electron platyrhynchum*). It was repeated steadily at intervals of a few seconds. The previous day I had heard the same note on Roldan Cay and saw the dove, but it eluded me before I was able to identify it.

Peters described this race of the wide-ranging *L. plumbeiceps* from 2 skins taken by von Wedel near Almirante November 15 (the type), and Changuinola September 30, 1928, and listed another collected by Benson near the town of Bocas del Toro. There is 1 specimen in the collection of the Gorgas Memorial Laboratory secured back of Almirante on March 20, 1961.

As a species *Leptotila plumbeiceps* ranges from Tamaulipas south through eastern Central America to western Bocas del Toro. In Costa Rica it is found also on the Pacific slope. It appears again in Colombia on the western slope of the Western Andes, and in the Cauca Valley. Those who have examined specimens of the Colombian population have found them so similar to those of Central America that they have considered the two groups identical. Hellmayr and Conover (Cat. Birds Amer., pt. 1, no. 1, 1942, p. 587), though they examined none of the few known specimens of *notius*, listed this name in the synonymy of the typical form. However, I find that the skins available differ in distinctly darker color, as they are more olive above and darker on the sides and flanks, with the crown and hindneck darker gray. It is probable that this race is confined to the forests around the Chiriquí Lagoon, and the lowlands of adjacent Costa Rica.

**LEPTOTILA BATTYI (Rothschild): Brown-backed Dove;
Paloma Cabeciceniza Castaña**

Differs from *L. p. notius* in brighter brown back, more pinkish breast, and brownish gray cheeks.

Description.—Length 235-255 mm. Adult male, forehead grayish white, changing to gray on forecrown, with rest of crown and hind-neck dark slate-gray; rest of upper surface, including wing coverts, inner secondaries and the upper side of the central tail feathers chestnut-brown; outer secondaries, primaries, and alula fuscous-black; throat white; cheeks brownish gray; sides of neck light slate-gray; foreneck, breast, and sides light vinaceous; abdomen and under tail coverts white; flanks mouse brown; under wing coverts, and inner webs of primaries and secondaries rufous; under surface of tail black, with outer feathers tipped with white.

Female, somewhat duller colored on back and breast.

Immature, a specimen of *L. b. battyi* in the American Museum of Natural History, taken May 11, 1901, has a few feathers of the juvenile plumage remaining on the forehead, crown, neck, and upper breast, which are wood brown edged with cinnamon; greater wing coverts with an indistinct subterminal bar of dark neutral gray and a narrow tip of cinnamon.

Leptotila battyi is so similar in general appearance to *Leptotila plumbeiceps* that its two forms have been listed as geographic races of that species. On close comparison *battyi* is seen to be brighter in color, and in life it is found that the call notes of the male are distinctly different. It is obvious, from the latter fact especially, that they are different specific entities.

Two geographic races are recognized, both found in Panamá.

LEPTOTILA BATTYI BATTYI (Rothschild)

Leptotila battyi Rothschild, Bull. Brit. Orn. Club, vol. 12, December 30, 1901, p. 33. (Isla Coiba, Panamá.)

Characters.—Crown darker gray with forehead only slightly paler, back somewhat more chestnut-brown; foreneck and breast more vinaceous; flanks grayish brown.

A female taken January 17, 1956, had the iris dull yellow; bare loreal area dull red; rest of bare skin on side of head dull neutral gray; bill black; tarsus and toes dull red; claws wood brown.

Measurements.—Males (6 specimens), wing 134.5-143.5 (137.8), tail 81.0-83.8 (81.8), culmen 14.0-16.9 (15.6), tarsus 31.2-34.0 (32.7) mm.

Females (8 specimens) 131.0-142.2 (137.3), tail 80.6-89.2 (84.1), culmen 14.8-17.7 (16.8, average of 6), tarsus 31.5-33.2 (32.1) mm.

Resident. Common in the forests of Isla Coiba.

This species was one of the common forest birds on Isla Coiba during my work there in 1956, so abundant that in spite of their secretive habits I saw them nearly every day. Their range extended from the woodland swamps back of the mangroves, where the rivers came down to the sea, to the high forests that covered the hills of the interior of the island. They live and feed on the ground, usually two or three in company. When flushed, if startled they dart swiftly to cover where they are secure, but more often fly a few feet to a low perch on a log, or on a branch in the undergrowth. On the ground they walk with bobbing heads. If I were near often they stood motionless, when it was difficult to see them in the dim light of their heavily shaded haunts. In early morning I noted them on open trails, but at any slight alarm they flew immediately into their usual cover.

In January and early February some of the males were calling, a single hooting note, so highly ventriloquial that we never succeeded in actually seeing the bird as it performed, though we were certain of the source. The birds when calling appeared to rest on low perches where they were completely concealed. In spite of every care in stalking, when we came too near they became silent, and either flew or dropped to the ground and walked away. Invariably it seemed that the sound came from the trees above, though we knew that the bird was in the undergrowth near at hand.

They were esteemed highly for the table, and many were trapped by the convicts and sold alive, usually at a price of 60 cents a dozen.

This is one of the most handsomely marked species of its genus.

LEPTOTILA BATTYI MALAE Griscom

Leptotila plumbeiceps malae Griscom, Amer. Mus. Nov., no. 280, September 10, 1927, p. 4. (Cerro Montuosa, 750 meters elevation, Herrera, Panamá.)

Characters.—Very slightly deeper brown, less chestnut above; crown slightly lighter gray, with the forehead paler; foreneck and breast faintly paler.

A male taken on Isla Cébaco on January 14, 1965, had the iris yellow; bare loreal area dull red; edge of eyelid dull black; bill and cere dull black; crus, tarsus, and toes somewhat dull pinkish red.

Measurements.—Males (4 specimens), wing 135.9-144.9 (139.2), tail 82.4-86.0 (83.5), culmen 15.3-17.8 (16.4), tarsus 31.2-32.9 (32.4) mm.

Females (2 specimens), wing 139.4, 142.5; tail 83.7, 99.5; culmen 16.6, 17.4; tarsus 31.5, 33.6 mm.

Resident. Found locally on the Azuero Peninsula in southern Veraguas and western Herrera in the forests on the mountain slopes. Isla Cébaco.

This subspecies was described from a female taken August 2, 1925, by Rex Benson on Cerro Montuosa, at an elevation of about 750 meters. John Aldrich (Scient. Publ. Cleveland Mus. Nat. Hist., vol. 7, 1937, p. 62) secured a female February 23, 1932, on the Río Mariato, and a male on March 7 at 600 meters on the slopes of Cerro Viejo, both points on the Veraguas side of the range, about 15 kilometers in an air line from the type locality. He found them in heavy forest where they "flushed with a long partridge-like whir of wings from the trails ahead of us as we walked along. It was not common anywhere."

On Isla Cébaco in mid-January 1965, I found these doves in small numbers, mainly along the borders of quebradas where some of the heavy undergrowth of the original forest remained to afford them cover. As they flew, the brown back distinguished them from the grayer *rabiblanca* that also was present. Their call, *hoo-hoo*, given very slowly, was increased occasionally by a third repetition. The notes had the resonant quality of those of the *rabiblanca*, but with less carrying power. In general the flight and mannerisms are those of *Leptotila v. verreauxi* but in addition to the brighter brown back, the tail shows a little less white. Once I found 4 together on the ground, but in other encounters saw single individuals only. Three males were taken.

The race is only slightly different from typical *L. b. battyi* of Isla Coiba, the latter displaying merely the somewhat darker colors normal in resident populations on that island.

LEPTOTILA CASSINII (Lawrence): Cassin's Dove;
Paloma Selvática

Similar in size to the white-fronted dove, but darker colored; gray below and grayish brown crown; with much less white in the tail.

Description.—Length 240 to 260 mm. Adult male, forehead grayish white, shading to gray on the crown and brown on the nape; hindneck grayer, sometimes with a purplish gloss; upper surface olive-brown; outer tail feathers darker, tipped narrowly with white; primaries dull black; chin white; cheeks pale gray, shading to purplish gray which covers the neck and chest; lower breast gray, washed with pinkish or pale cinnamon; abdomen white; central under tail coverts white, gray

at sides; sides olive-brown; axillars, under wing coverts, and basal portion of inner webs of remiges cinnamon-rufous.

Female, usually similar, but in some slightly duller in color.

Immature, wing coverts tipped, and secondaries, inner primaries, and tail feathers edged with cinnamon-rufous; nape with shaft streaks of cinnamon; foreneck and chest brown tipped with cinnamon.

This species, similar in form to the slightly larger white-fronted dove, differs in its darker colors, and also in habitat, as it is a bird of the forest. However, the two species may overlap near jungle edge, or both may be found in areas of suburban gardens, as in Panamá City and the Balboa area of the Canal Zone.

Three geographic races are found in the Republic.

LEPTOTILA CASSINII CASSINII (Lawrence)

Leptotila cassinii Lawrence, Proc. Acad. Nat. Sci. Philadelphia (meeting of August 13th), 1867, p. 94. (Line of Panama Railroad on the Atlantic Slope, Canal Zone, Panamá.)

Characters.—Nape duller, hair brown; breast darker gray.

Iris Marguerite yellow; edge of eyelids, bare skin at posterior edge of lower eyelid, and bare loreal area dull rose-red, bordered above and below by neutral gray; cere and bill black; tarsus and toes dull rose-red; crus in some a little brighter red; anterior scutes on top of toes brownish red; claws mouse brown.

Measurements.—Males (10 from Panamá), wing 130.0-138.4 (133.8), tail 77.0-85.3 (81.7), culmen 13.6-15.7 (14.4), tarsus 32.6-34.0 (33.2) mm.

Females (10 from Panamá), wing 130.0-136.0 (133.0), tail 77.6-87.0 (80.7), culmen 13.8-15.7 (14.7), tarsus 31.2-33.1 (32.1) mm.

Resident. Found in heavily forested areas in the Tropical Zone; on the Pacific slope, in western Veraguas (formerly, no recent records); and from the Canal Zone east through Darién to the Colombian boundary. On the Caribbean slope from western Colón (Chilar), and northern Coclé (El Uracillo), east, including the Chagres River Basin, through San Blas to the Colombian boundary. Recorded to 550 meters at Cana on Cerro Pirre and to 575 meters on the upper Río Tacarcuna, on the slopes of Cerro Malí.

With regard to the occurrence of this bird on the Pacific slope of Veraguas, there is a specimen in the British Museum (Natural History) collected by Arcé in 1875 that is labeled Montaña de Vermejo, a place that I have not been able to locate. A melanistic specimen in the U.S. National Museum, also taken by Arcé, is marked only

"Veragua, 1875." Further, one in our collection from Soná was purchased from the Rev. H. Th. Heyde. It is without date, but other skins from this locality that came from the same collector were taken in March and April 1888. The bird seems to have disappeared in this region with the destruction of the forests. I have found no other record of it on the Pacific side west of the Canal Zone. There, it is common in suitable cover around Balboa and Ancon, and I have examined specimens taken by collectors of the Malaria Control Service at Cocolí, and near the settlement of Santa Clara on the Nuevo Emperador Road.

This, the most widely distributed form of the species in Panamá, while not rare is decidedly less numerous in its forest haunts than is the white-fronted dove in its more open coverts. The abundance of Cassin's dove usually is indicated by the calls of the males, as the birds themselves remain under cover. Where they are not hunted they are tame, and when approached merely walk aside on the jungle floor. They tend to flush quickly with rattling wings, but drop to the ground again after a short flight, or alight to rest quietly on some low perch. Around our jungle camps during quiet afternoons they have come to drink from little streams. In uninhabited areas often they are inquisitive, as I have had them walk toward me with nodding head and spreading tail. One taken by Goldman at Cana had the stomach well filled with small seeds, mixed with vegetable fibers and fragments of a roach.

The cooing call of the males is like that of the white-fronted dove, but is somewhat less resonant, and usually a trifle less prolonged. Nests are reported from January to September. The normal set is of 2 eggs. One nest, in forest near Chilar, in western Colón, March 8, 1952, was a fairly substantial platform of small twigs, lined with softer plant stems. The central depression, of sufficient depth for safety, held a recently hatched young bird, covered sparingly with dull cinnamon-brown down, and an egg near hatching. The egg was white with a slight gloss. Hallinan (*Auk*, 1924, pp. 310-311) described a nest found near Gatun, May 4, 1909, placed about 2 meters from the ground on a limb of a shrub, partly supported by vines. The white egg measured "1.19×.86 inches," or 30.2×21.8 mm. Stone (*Proc. Acad. Nat. Sci. Philadelphia*, vol. 70, 1918, p. 243) gives the size of an egg collected by L. L. Jewel, near Gatun, as 1.15×0.83 inches, which equals 29.2×21.0 mm.

The first specimens known of this dove, taken on the Río Truandó in the lower Atrato Basin, were confused with *Leptotila verreauxi*.

That the present species was distinct became evident to Lawrence when he received a collection made by J. R. Galbraith and McLeannan in what is now Panamá. While the type locality usually is given as the line of the Panama Railway, this may be restricted to that area of the railroad on the Atlantic slope, since Lawrence in his account of the collection says that only a few species, which he enumerates in a list that does not include this dove, were taken on the Pacific side.

LEPTOTILA CASSINII RUFINUCHA (Sclater and Salvin)

Leptotila rufinucha Sclater and Salvin, Nomencl. Avium Neotrop., 1873, p. 162. (Bugaba, and the south slope of Volcán de Chiriquí, Panamá.)

Characters.—Nape and upper hindneck cinnamon, much brighter brown than in typical *cassinii*; lighter gray on the breast, and somewhat brighter brown above.

A male taken on Cerro Pando, beyond El Volcán, February 28, 1954, had the iris Marguerite yellow; edge of eyelids and bare loreal area dull rose-red; bill dull black; tarsus and anterior part of the toes dull red; distal half of the toes fuscous.

A female, collected on the Río San Bartolo near Puerto Armuelles, Chiriquí, March 1, 1966, had the iris pale yellow, bare lores and line above and below eye dull red; rest of bare eyelids dull light gray; cere and bill black; tarsus and toes light bright red; claws dull dark brown.

Measurements.—Males (10 from Chiriquí and Costa Rica), wing 129.8-137.0 (134.0), tail 76.2-85.4 (81.4), culmen 13.0-16.5 (14.2), tarsus 32.3-33.7 (32.8) mm.

Females (10 from Chiriquí and Costa Rica), wing 127.0-136.7 (131.4), tail 78.7-87.6 (82.3), culmen 14.0-16.3 (14.6), tarsus 30.6-35.0 (32.0) mm.

Resident. Found in western Chiriquí, from the lowlands to 1,300 meters elevation on the western slopes of the volcano.

While formerly Veraguas was included in the range, so far as I am aware this was based on specimens received from Arcé marked "Veragua" without more definite locality, which apparently came from farther west than the present boundary of the province. All of the fully documented skins that I have seen are from western Chiriquí. The bird is found from the lowlands near Puerto Armuelles and, formerly at least, at Bugaba and Divalá, to the forests near El Volcán, and from there west to the Costa Rican boundary. The most eastern locality that has come to attention is Francés, below Boquete, where it was collected by Watson. This race is found also in western Costa Rica.

Near El Volcán and Santa Clara I noted these doves in dense

thickets, often in tall second-growth, where they ranged in pairs. They were not especially wary, since hunters seldom disturbed them there, so that when startled usually they flew only a few meters to perch on a low branch, or walked quickly away on the ground. In this area they came out in early morning on the open roads, and also appeared in pasturelands, where there were only scattered thickets. On the whole they did not frequent heavy forest as does the typical race of Cassin's dove, but seemed to seek open habitat, more like that favored by the *rabiblanca*, the white-fronted dove.

The call of the male was the usual resonant, prolonged *coo*, somewhat higher in sound than that of the related species.

Skutch (Wilson Bull., 1964, pp. 240-242), in southwestern Costa Rica, found this race nesting from February to late September. The nests, often more slightly built than those of the *rabiblanca*, usually about 125 millimeters in diameter, were placed at the edge of woodland, or in second-growth thickets, hidden among vines, from 1 to 5 meters above the ground. The 2 glossy eggs were white, with a faint tint of buff. One set measured 26.0×21.5 , and 27.3×20.9 mm.

LEPTOTILA CASSINII CERVINIVENTRIS (Sclater and Salvin)

Leptotila cerviniventris Sclater and Salvin, Proc. Zool. Soc. London, May (June 1), 1868, p. 59. (Choctum, Alta Vera Paz, Guatemala.)

Characters.—Darker than *L. c. cassinii*; breast more heavily washed with vinaceous; sides browner; dorsal surface decidedly browner.

Measurements.—Males (4 from Bocas del Toro), wing 131.0-137.1 (134.3); tail 79.1-85.7 (81.9, average of 3), culmen 13.4-14.8 (14.2), tarsus 31.8-34.7 (33.6) mm.

Females (4 from Bocas del Toro), wing 125.0-132.9 (129.5), tail 77.0-82.0 (78.6, average of 2), culmen 14.2-15.5 (14.8), tarsus 32.0-33.9 (33.0) mm.

Resident. Found in the tropical lowlands of western Bocas del Toro, where it is recorded from the Costa Rican boundary east around the Laguna de Chiriquí to Cricamola.

In choice of habitat this race resembles the typical form. Early collectors around the bay shores found it common, but it seems now to be reduced in number, probably through hunting, as in 1958 I noted single birds on only three occasions, and did not succeed in collecting specimens.

In its full range *L. c. cerviniventris*, as recognized at present, is found through the Caribbean lowlands north to Chiapas in southern México. The only specimens that I have seen from Bocas del Toro

are those in the Museum of Comparative Zoology. It is possible that birds from that area may prove to be separable under another name, as they appear darker than a series examined from farther north between Costa Rica and southern México.

GEOTRYGON VERAGUENSIS Lawrence: Olive-backed
Quail-Dove; Paloma Verdusca

FIGURE 7

Geotrygon veraguensis Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 8, June 1866, p. 349. (El Mineral, northern Veraguas, Panamá.)

A dark-colored quail-dove, with a prominent white streak on the side of the head.

Description.—Length 220-240 mm. Adult male, forehead white or faintly buff, changing to gray on the center of the crown, and grayish purple on the occiput and nape; rest of upper surface, including wing coverts, secondaries, and tail olive-brown, glossed with dull green; primaries dusky; a prominent white stripe from the rictus underneath the eye to the back of the head; throat white to buffy white, washed with brown posteriorly; foreneck, sides of neck, and chest brownish gray, glossed with dark bronze-green, the chest color merging with the brownish gray of breast and sides; abdomen white, more or less tinged with buff, flanks and under tail coverts cinnamon-buff; under wing coverts, and under side of primaries at base cinnamon.

Adult female, similar but decidedly darker; forehead buff; flanks and under tail coverts darker brown.

Juvenile, forehead grayish brown, with a few dull cinnamon feathers; light stripe on side of head reduced to a narrow line, with the darker stripe below dull cinnamon-brown; upper surface olive, with tips and edgings of rufous, that are especially marked on the wing coverts; throat white, changing below to light cinnamon; chest cinnamon-rufous, changing to pale cinnamon on breast, and dull pale cinnamon-buff on abdomen; under tail coverts cinnamon.

A male, taken February 18, 1961, on the upper Río Boquerón, had the iris Marguerite yellow; edge of eyelid, bare lores, and bare space around eye dull red; bill and cere black; anterior face of tarsus and the toes dull red; back of tarsus flesh color; claws dark neutral gray, faintly paler at the extreme tip.

A female, collected March 5, 1963, at Armila, San Blas, had the iris yellowish white; the bare areas on the side of the head wine red; bill and cere black; entire tarsus and toes light red; claws fuscous-brown.

Measurements.—Males (8 from Panamá), wing 130.0-136.0 (133.6), tail 69.1-74.3 (71.0), culmen 15.7-17.9 (17.4), tarsus 37.6-39.7 (38.3) mm.

Females (5 from Panamá), wing 128.8-132.4 (130.4), tail 63.9-71.8 (68.7), culmen 16.1-18.4 (17.1), tarsus 35.1-36.6 (35.9) mm.

Resident. Local in the Tropical Zone in heavy forest, on the Caribbean slope from Bocas del Toro (Almirante, Cricamola) east through northern Veraguas, northern Coclé, Colón (Chilar on the Río Indio, Portobelo), and the upper Chagres Basin (Río Boquerón, Río Pequéní) to eastern San Blas (Armila, Puerto Obaldía); on the Pacific side in Darién in the Río Tuira Valley (Río Cupe, Boca de Paya), to 900 meters on Cerro Tacarcuna (La Laguna), and on the Río Jaqué.

There is no record for the area of the Canal Zone, and the few definite reports for Veraguas are from the Caribbean slope.

These quail-doves frequent the denser humid forests where they live on the ground like others of this group. When not startled they walk aside when approached, and then remain quiet. As their dark colors blend completely with the shadows of their haunts it is only the slight movements of the head that betray them. More often they flush with a slight rattle of the wings, and fly off in the undergrowth. On the upper Río Boquerón, where the stream was narrow, on several occasions when I saw them fly across, on the wing they appeared plain gray with a faint flash of the white line on the side of the head. I have not heard them calling, though I have noted that specimens taken in February and March in the upper Chagres Basin were near breeding.

One taken by E. A. Goldman near Portobelo had the stomach filled with a partly digested mass of seeds, that included one of a *Scleria*, also a berry, and bits of a beetle.

The species is found to the north on the Caribbean slope of Costa Rica, and to the south of Panamá ranges through western Colombia to northwestern Ecuador. Current treatment considers birds throughout this extensive area as a single group, with considerable variation in depth of color. Part of the supposed color phases that others have noted I believe have been due to specimens in which the sex has not been correctly determined. In the series of 30 modern skins from Panamá and Colombia now in the U.S. National Museum, the supposed light and dark phases refer to males and females, the latter being darker. Comparisons also indicate that the southern populations may average slightly darker in both sexes, a matter left for determination when more material has been seen.

Lawrence in his description of this species, from a mounted bird in the collection of Dr. J. K. Merritt, listed it only as "Habitat. Veragua." Salvin and Goldman (Biol. Centr.-Amer., Aves, vol. 3, 1902, p. 268) give more information as they state that "*G. veraguensis* was originally discovered by Dr. Merritt in the district of El Mineral de Veraguas, on the northeastern slope of the Cordillera, to the south-eastward of the Chiriqui Lagoon." This serves to fix the type locality as on the Caribbean slope.

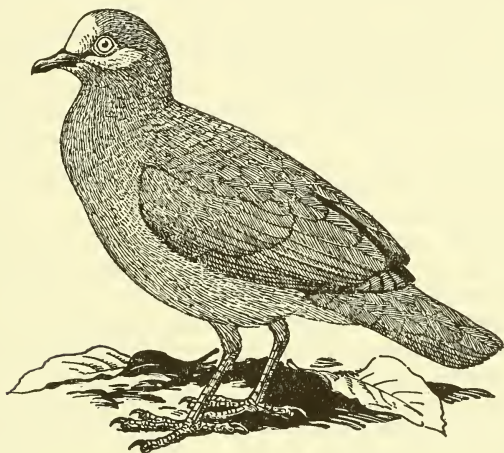


FIGURE 7.—Olive-backed quail-dove, paloma verdusca, *Geotrygon veraguensis*.

GEOTRYGON LAWRENCII LAWRENCII Salvin: Lawrence's
Quail-Dove; Paloma Morena

Geotrygon lawrencii Salvin, Ibis, ser. 3, vol. 4, no. 4, October 1874, p. 329.
(Calobre, Veraguas, Panamá.)

Similar to *Geotrygon costaricensis*, but with forehead grayish white, hindneck duller green, and wing coverts, lower back, and rump olive-brown.

Description.—Length 250-270 mm. Adult (sexes alike), forehead grayish white; center of crown bluish gray; nape, hindneck, and upper back grayish green; lesser wing coverts and center of back dull purple-violet; rest of wing coverts, inner secondaries, lower back, rump, and central tail feathers olive-brown; primaries, outer second-

aries, and outer tail feathers dusky gray; malar region and upper foreneck white; ear coverts pale gray; a black streak along the lower side of the head; lower foreneck and upper breast gray, with a greenish wash on the adjacent sides; lower breast paler gray; abdomen very pale buffy white; sides and flanks grayish brown; under tail coverts white; under wing coverts dull brown.

Juvenile, above dark olive, margined and barred with pale brown and dusky; foreneck and breast dusky, barred with buffy brown.

A male, taken on Cerro Malí, Darién, February 21, 1964, had the iris orange-brown; thickened eyelid dull red; mark on bare skin in front of eye, and a narrow line across base of lower eyelid dull pinkish red; rest of bare skin dull neutral gray; edge of maxilla and of mandible from cere to gape dull red; cere and rest of maxilla purplish black; gonys to tip of mandible horn color; rest of mandible dull dark neutral gray; tarsus and toes dark red; claws fuscous-brown.

Measurements.—Males (8 from Panamá and Costa Rica), wing 136.0-144.7 (140.3), tail 72.5-77.5 (74.2), culmen 14.5-14.6 (14.5, average of 3), tarsus 39.0-43.0 (41.2) mm.

Females (5 from Panamá and Costa Rica), wing 137.0-142.4 (139.4), tail 70.0-78.8 (74.3), culmen 14.3-14.6 (14.5, average of 3), tarsus 40.0-44.0 (41.7) mm.

Resident. Rare in the upper Tropical and Subtropical Zone forests on the Caribbean slope of Bocas del Toro (Río Changuena, Boquete trail); eastern Colón (Cerro Bruja, 600 meters); mountains of Veraguas (above Santa Fé and Calobre); Western Province of Panamá (Cerro Campana, 900 meters); Darién (Pucro, Cerro Malí, Cerro Tacarcuna to 1,450 meters).

This is a species of dense, humid forests that has been rarely seen by naturalists. The older records come from the western part of the Republic, and from Costa Rica. There is a recent specimen in the U.S. National Museum, a male, taken by collectors of the Gorgas Memorial Laboratory, September 20, 1961, on the Río Changuena in Bocas del Toro. Goldman, on June 8, 1911, at 600 meters elevation on Cerro Bruja, secured an immature female, not quite grown, as it walked with nodding head on the ground in the heavy forest.

On Cerro Malí Dr. Pedro Galindo collected a female, May 23, 1963, and later, in February 1964, I secured 3 more here, in addition to recording them on Cerro Tacarcuna, and also at Pucro, at the base of the mountains. Like other quail-doves they were found on the forest floor. When approached they walked quietly away, without haste, but under shelter of the ground cover so that it was difficult to

see them. Their presence was known usually by their call, a loud *coo-ah*, repeated at short intervals. The tone is nasal, with a batrachian sound, especially when heard at a distance. In fact, I mistook the first ones heard for the calls of some forest frog.

The first account of breeding, and also the first report of the species for the locality, is that of Storrs L. Olson who collected a male sitting on a nest at about 900 meters elevation on Cerro Campana, Panamá, on June 19, 1966. The nest, placed in a bush somewhat more than 1½ meters above the ground, was a rather large accumulation of sticks, flattened in form, with a central depression lined with finer material. This contained 1 egg, pale buff in color, with measurement of 37.4 × about 26.0 mm. As it was somewhat damaged by the shot, the dimension of the transverse diameter may not be minutely accurate. Other individuals of this species were recorded in the area. (Olson, Powell, and Eisenmann, Condor, 1968, p. 179.)

GEOTRYGON GOLDMANI Nelson: Goldman's Quail-Dove;
Paloma Cabecicastaña

Size and general appearance of Lawrence's quail-dove, but with crown and nape russet-brown, and side of head buff.

Description.—Length 265-285 mm. Male, crown and nape russet-brown, paler on forehead; hindneck grayish brown; center of back dull purple-violet; rest of upper surface rather dull brown; alula, primary coverts, and primaries grayish dusky; cheeks buff, becoming gray on auricular area, with a line of black along lower margin; throat white; foreneck and breast gray; abdomen white to buff, finely marked with gray; sides and flanks light olive-brown; under tail coverts gray to brownish gray, freckled with darker gray, in some with paler tips; under wing coverts grayish brown.

Female, usually darker on the under surface.

Juvenile, above dull cinnamon-brown, edged slightly with dusky violet; below dusky brown, edged with cinnamon-buff.

This is a ground-living species of the high forests of eastern Panamá that is known from few observations. Two forms are recognized.

GEOTRYGON GOLDMANI GOLDMANI Nelson

Geotrygon goldmani Nelson, Smithsonian Misc. Coll., vol. 60, no. 3, September 27, 1912, p. 2. (Cerro Pirre, 1,500 meters elevation, Darién.)

Characters.—More olive-brown above; breast and foreneck lighter gray; sides and flanks lighter brown.

A male shot on Cerro Malí, Darién, February 22, 1964, had the iris orange, edge of eyelids, a spot in front of the eye, and gape dull red; bare loreal area dark neutral gray; bill and cere black; tarsus and toes dull red; claws dull grayish brown.

Measurements.—Males (10 specimens), wing 138.2-148.2 (145.1), tail 84.5-90.0 (88.5), culmen 13.2-16.7 (14.8), tarsus 38.4-45.3 (41.2) mm.

Females (7 specimens), wing 138.8-145.7 (143.0), tail 83.8-90.8 (86.5), culmen 14.0-16.9 (15.5), tarsus 38.0-42.7 (40.7) mm.

Resident. Local in Tropical and Subtropical Zones in the mountain forests of Darién; recorded from Cerro Sapo, at 900 meters; Cerro Pirre, from 900 to 1,600 meters; Cerro Tacarcuna and Cerro Malí, at 1,450 meters.

This was one of the new birds collected by E. A. Goldman in 1912 on the higher slopes of Cerro Pirre. He found it common, and in April heard its call near his camps throughout the day—a hollow cooing sound like that made by blowing in a bottle. His first specimen was shot from a treetop, but all others were found on the forest floor, where they walked aside when approached. Dr. Pedro Galindo collected 2 here on August 9, 1965.

The stomach of one of Goldman's specimens was filled with seeds, most of them broken, some of rather large size. With them the bird had swallowed a small stone that measured 16 by 7 mm., with a thickness of $3\frac{1}{2}$ mm.

On the Colombian slopes of the Tacarcuna range in the Chocó, Harold E. Anthony collected specimens on the headwaters of the Río Cutí on March 29, April 1, and April 10, 1915. De Schauensee (Acad. Nat. Sci. Philadelphia, Not. Nat., no. 144, Oct. 13, 1944, p. 4) has recorded a young bird, not fully grown, from the low elevation of 90 meters on the Río Juradó, Chocó, Colombia.

Three were collected by the party from the Gorgas Memorial Laboratory on Cerro Malí on May 27, 31, and June 4, 1963, and I secured another here February 22, 1964. The birds ranged across Cerro Malí and the slopes of Cerro Tacarcuna in company with *Geotrygon l. lawrencii*, but were less common. I saw them occasionally walking quietly in the dark shadows of the forest undergrowth, and recorded them also by their calls. These, heard usually in early morning, were a curious sound, quite different from the croaking of *G. lawrencii*, well characterized by Goldman's description of air blowing over the mouth of a bottle.

While the date on the paper by E. W. Nelson in which the description of this species appeared is printed as September 24, 1912, it was not issued until September 27.

GEOTRYGON GOLDMANI OREAS Wetmore

Geotrygon goldmani oreas Wetmore, Proc. Biol. Soc. Washington, vol. 63, December 29, 1950, p. 172. (Cerro Chucantí, Serranía de Majé, 360 meters elevation above Quebrada Cauchero, Province of Panamá, Panamá.)

Characters.—Definitely darker than *Geotrygon goldmani goldmani*, especially on the upper surface, foreneck and breast; hindneck, wings, rump, upper tail coverts, and tail more chestnut, less olive; crown more chestnut; foreneck and chest darker gray; upper abdomen darker.

Measurements.—Male (the type), wing 138.2, tail 85.8, culmen 15.4, tarsus 40.5 mm.

Resident. Apparently uncommon, restricted to the higher levels of the isolated Cerro Chucantí in the Serranía de Majé, near the eastern end of the Province of Panamá.

In the early morning of March 18, 1950, as I reached the level area on the ridge above our camp a dark-colored dove walked quietly ahead of me, barely seen in the deep shadows of the jungle floor. As it drew aside to hide in the partial protection of low herbage, I had the impression that another accompanied it, but in the dim light this was not certain. In the hand, the bird was long in leg, heavy in body, and dark in color. The marked differences of this bird from the typical race have become increasingly evident as further skins of *Geotrygon g. goldmani* have come to hand. The mountain area where it was collected is isolated from the highlands that lie to the north, where the typical race is found.

GEOTRYGON COSTARICENSIS Lawrence: Costa Rican Quail-Dove; Paloma Costarriqueña

Geotrygon costaricensis Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 9, April, 1868, p. 136. (Las Cruces de Candelaria, Serranía de Candelaria, Costa Rica.)

A quail-dove with forehead buff, hindneck light green, back bright purple; wing coverts, lower back and rump chestnut-brown.

Description.—Length 240-280 mm. Adult (sexes alike), forehead buff, with the area on crown above and behind the eye somewhat greenish gray; back of crown to upper back clear dark green, with a faint bronze reflection; wing coverts, inner secondaries, rump and upper tail coverts reddish brown, with the center of the upper back dis-

tinctly purple; primaries and outer secondaries dusky gray; central tail feathers dull brown; the other rectrices similar to the primaries, but tipped with brownish neutral gray; malar region pale buff, becoming whiter posteriorly; ear coverts dull gray; a prominent black streak on side of head below malar region; throat and upper foreneck dull white; lower foreneck and breast gray, washed with greenish on sides; lower breast feathers tipped with pale buff; abdomen pale buff; sides light brown; axillars and under wing coverts grayish brown.

Juvenile, forehead duller; crown and hindneck dusky gray, with a faint gloss of green; upper surface dull chestnut, barred indistinctly with dusky, and with feather tips of dull cinnamon; lower surface barred and freckled with dull gray and dull cinnamon; abdomen mainly buff.

Iris dark brown; bill dusky, reddish at the base; bare space around eye carmine; tarsus and toes carmine; soles whitish; claws fuscous.

Measurements.—Males (9 from Panamá and Costa Rica), wing 137.8-143.4 (140.3), tail 68.0-80.2 (75.1), culmen 12.2-16.4 (13.4), tarsus 39.6-49.9 (43.1) mm.

Females (5 from Chiriquí and Costa Rica), wing 131.8-135.5 (134.3), tail 71.2-76.0 (73.7), culmen 13.7-14.8 (14.0), tarsus 41.2-43.2 (41.9) mm.

Resident. Rare in the Subtropical Zone in the mountains of Chiriquí from 1,700 to 3,000 meters; 1 record for Veraguas (Chitra).

This is a little known species of the high mountain forests that has been collected on the slopes of the volcano in Chiriquí above Boquete, and above Cerro Punta. Benson secured 2 specimens February 3 and May 11, 1926, above Chitra, which are the only records for Veraguas (see Griscom, Amer. Mus. Nov., no. 280, 1927, p. 2).

On March 1, 1955, I flushed 2 in the forest at 2,100 meters above Cerro Punta and secured a male. Another recent record is of a female obtained by Dr. Frank Hartman near the Casita Alta at 2,100 meters beyond the Finca Lérída, above Boquete.

The species ranges also in the mountains of central and southern Costa Rica. Skutch (Wilson Bull., 1964, p. 243) near Los Cartagos, in the Province of Heredia, Costa Rica, found a nest on June 22, placed 4 meters from the ground on a slender branch of a shrub standing in bamboo undergrowth in heavy oak forest. It was a flat platform of twigs and a few rootlets, approximately 175 by 250 mm., with green moss and liverworts mixed among the coarser materials. It held 1 partly grown young bird.

GEOTRYGON VIOLACEA ALBIVENTER Lawrence: **Violaceous**
Quail-Dove; Paloma Violácea

Geotrygon albiventer Lawrence, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 108.
(Near Lion Hill Station, Canal Zone, Panamá.)

A quail-dove that is chestnut-brown above, with a strong violet sheen on the center of the back.

Description.—Length 210-245 mm. Adult male, crown gray, forehead paler, both washed with purple; rest of upper surface chestnut-brown, with the center of the back strongly violet and purple; sides of head and throat gray, washed with vinaceous; foreneck lilac at the sides, vinaceous at center, continuing thus over chest; rest of under surface white to buffy white; central under wing coverts white; remainder and under surface of wings chestnut to russet.

Female, similar but duller in color; more olive on upper surface; breast grayer.

Juvenile, crown blackish brown, forehead a little paler; elsewhere on upper surface olive-brown, tipped and margined with dull cinnamon; breast brownish gray, also tipped with cinnamon; no violet on the back.

Measurements.—Males (10 from Nicaragua, Costa Rica, and Darién), wing 139.6-148.8 (142.5), tail 70.8-86.2 (78.8), culmen 13.5-14.9 (14.1), tarsus 26.0-29.4 (27.3) mm.

Females (6 from Costa Rica, Darién, and Chocó), wing, 138.6-146.9 (144.0), tail 72.0-79.9 (75.6), culmen 14.0-15.2 (14.6), tarsus 27.0-28.5 (27.9) mm.

Resident. Rare, recorded from the Atlantic slope of the Canal Zone; Cerro Azul, Province of Panamá; and Cerro Sapo, Chepigana, and El Real, Darién.

The original description by George N. Lawrence was taken from a male collected by McLeannan near the Lion Hill Station of the Panama Railroad, in the area now submerged in Gatun Lake. E. A. Goldman obtained a female at 300 meters elevation on Cerro Azul on March 23, 1911. This bird flushed from the ground in a forested canyon, and alighted on a limb about 6 meters from the ground. The Vanderbilt Expedition of 1941 secured a female on Cerro Sapo, back of Garachiné, Darién, April 29. Richardson collected 3 at Chepigana, in December 1914, 5 at El Real in December and the following January, and 1 at Capetí, back of Boca de Cupe, May 26, 1915. A specimen in the British Museum (Natural History) received from Boucard is labeled Panamá without other detail.

These are the only records noted to date in the Republic. Elsewhere

it has been found in Nicaragua, Costa Rica, northern and eastern Colombia, and Venezuela. In view of the number taken at El Real it should be noted that I did not find it there during work in early 1964. Apparently this is a bird that disappears when its forest haunts are invaded.

GEOTRYGON MONTANA MONTANA (Linnaeus): Ruddy Quail-Dove; Paloma Montañesa

Columba montana Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 163. (Jamaica.)

Male reddish brown, with lighter throat, female, olive on breast and back; smaller than others of this genus, except the olive-backed quail-dove.

Description.—Length 210-235 mm. Adult male, above rufous-chestnut, paler on the forehead and wings; hindneck and back glossed with reddish purple; throat and a band on the side of the head, below the eye, pinkish cinnamon; lower part of side of head like back; foreneck and chest vinaceous-fawn color, paler on the breast, and changing to buff on abdomen; sides and flanks cinnamon-buff to clay color; under tail coverts cinnamon-buff; under side of wing cinnamon-rufous.

Adult female, forehead and side of head dull cinnamon; primaries, greater wing coverts, and alula dusky, bordered more or less lightly with cinnamon; rest of upper surface from crown to central tail feathers olive; outer tail feathers blacker; throat buffy white; foreneck and chest dull cinnamon to wood brown, changing to buff on abdomen; under tail coverts more cinnamon; sides and flanks olive-brown; under surface of wing dull cinnamon-buff to dull rufous.

Juvenile, above dark olive to dusky, with forehead paler; tertials, wing coverts and flight feathers tipped and edged with cinnamon; foreneck and chest olive-brown tipped with cinnamon; rest of lower surface buffy white to buff; sides more or less olive. (Males are lighter, brighter colored than females.)

A male taken on Cerro Malí, Darién, February 2, 1964, had the iris very dark brown; thickened edge of eyelids bright red; bare skin of loreal area, and above and below eye, pinkish red; base of maxilla, cere back to gape, and entire mandibular rami, dull red; rest of maxilla and mandible warm brown; front of tarsus and toes dark red; back of tarsus dull pinkish white; claws dull brown. From other records, the iris varies from brownish yellow to dull orange.

Measurements.—Males (10 from Panamá and northern Colombia),

wing 134.2-141.1 (137.2), tail 67.4-74.7 (70.5), culmen 11.1-13.0 (12.0), tarsus 28.2-31.8 (29.8) mm.

Females (8 from Panamá and northern Colombia), wing 132.2-138.8 (133.7), tail 68.0-73.6 (69.9), culmen 10.2-12.4 (11.3), tarsus 27.2-29.7 (28.8) mm.

Resident. Fairly common, but local throughout the Tropical Zone on both Pacific and Atlantic slopes, rarely in the lower Subtropical Zone; in the mountains ranging to 1,000 meters in Chiriquí, 900 meters in the Azuero Peninsula (Cerro Viejo), and in Darién to 900 meters on Cerro Pirre, and 1,400 meters on Cerro Malí; Isla Coiba; Isla Ranchería; Isla Cébaco.

This is the most common and widely distributed of the quail-doves of Panamá, more adaptable than others of its group, as it is found in second-growth forest, sometimes in tracts of small size, as well as in gallery forest, and in the denser stands in areas of heavy rainfall. It lives on the ground under the shadows of the undergrowth, and commonly is found in pairs, except when accompanied by its young. In passing through its haunts the birds walk aside with nodding heads, and stand quietly concealed in the shadows, or fly quickly with a flutter of wings for a few meters before they drop again to the ground. While they may inhabit level areas, it is more common to find them where the forest floor is broken by sloping hills, or is cut by quebradas.

Their call is a soft *coo*, low in tone, with a resonance that makes the sound seem to come from a distance though the bird may be near at hand. It differs in softer tone from the call of the male Cassin's dove that may be found near, or of the *rabiblanças* at the forest edge. Their food is mainly seeds and drupes that have fallen to the ground. One taken at Cana by E. A. Goldman had eaten many seeds of *Borreria*, with 1 of *Styrax*, and 4 of larger size.

The nests from which I have data have been placed a meter or two from the ground in vines or in the concealment of small branches. One found by Major General G. Ralph Meyer near the Madden Road in the Canal Zone was at the edge of woods near a trail. The nest was a shallow depression in a platform of dead leaves supported by a few reedlike plant stems. The 2 eggs are cream-buff, with 1 faintly paler than the other. They are short, subelliptical in form, and measure 24.8×20.2 and 25.1×20.2 mm. Field notes of M. A. Carriker, Jr., with another set of 2 eggs taken at the Hacienda Belén, Antioquia, Colombia, state that the male was incubating. In the British Museum (Natural History) eggs in a set of 2 from Morne Bleu, Trinidad, collected May 5, 1935, are pale buff, with the surface

slightly granular. In form they are long elliptical with measurements of 25.8×18.6 and 26.5×19.1 mm. In another set from the Mazaruni River, Guyana, collected October 6, 1936, the 2 eggs are cream-buff, very faintly granular and long elliptical in form, with measurements of 26.1×18.8 and 27.9×19.3 mm. These all average slightly smaller than several from Cuba and Jamaica in the National Museum collections. The latter range from $27.2-28.0 \times 20.6-21.6$ mm.

In Bocas del Toro this species is called *paloma chocolate*.

GEOTRYGON CHIRIQUENSIS Sclater: Chiriquí Quail-Dove;
Gorra Azul

Geotrygon chiriquensis P. L. Sclater, Proc. Zool. Soc. London, vol. 24, 1856, p. 143. (Boquete, Chiriquí, Panamá.)

A large quail-dove, with a black streak on the side of the head, and a bluish gray crown.

Description.—Length 280-290 mm. Adult (sexes alike), a narrow mark on the forehead cinnamon; crown and nape dark bluish gray; dorsal surface, wings, and tail dull chestnut-brown, with a gloss of purple from the center of the back to the sides of the upper breast; malar region cinnamon like forehead; space beneath eye grayish white, changing to brownish gray, lined indistinctly with pale buff; a very narrow line of black from the rictus to the bare skin around the eye; a prominent line of black across the lower cheek area, that extends back underneath the auricular region; throat pale buffy white, changing gradually to the light cinnamon of the lower foreneck, which in turn merges with the more rufous-cinnamon of the lower foreneck, upper breast, and sides; lower breast, abdomen, and under tail coverts cinnamon-buff; under wing coverts auburn.

Immature, upper surface, including crown and nape, vandyke brown, more rufescent on the wing coverts; scapulars and wing coverts barred rather indistinctly with dull black; foreneck, breast, and sides barred irregularly with dusky black.

A male taken at El Volcán, Chiriquí, on March 15, 1965, had the iris deep red; thickened edge of eyelid, and a narrow line from upper edge of bare skin in front of eye around the lower margin of the bare area to back of center of eye pinkish red; rest of bare space on side of head dull bluish slate; center of base of gonys dull slate (a small linear spot only); cere and rest of bill black; tarsus and toes dark pinkish red; claws brown.

Measurements.—Males (11 from Chiriquí), wing 146.8-151.6

(148.9), tail 76.2-86.9 (82.7), culmen 14.0-16.8 (15.2), tarsus 41.0-43.8 (42.4) mm.

Females (6 from Chiriquí), wing 140.8-147.5 (144.2), tail 78.4-84.0 (81.2), culmen 15.0-17.0 (15.9), tarsus 39.0-42.7 (41.5) mm.

Resident. Local in the Subtropical Zone in the mountains of Chiriquí and Veraguas, to an elevation of 3,000 meters.

This shy inhabitant of the highland forests lives in the concealment of undergrowth where it remains hidden and secure. Adults, found in pairs, may come out in early morning to walk with nodding heads in trails and roadways, but at any alarm they flush and disappear. In the more usual encounter, in hunting through heavy undergrowth, one may rise from the ground with rattling wings, but instantly it is gone from view. Birds for specimens are obtained only through slow and careful stalking in the known areas of occurrence, where each pair seems to have a territory or range.

A nest collected by T. B. Mönniche near the Finca Lérída, above Boquete, on August 24, 1950, is described by Blake (Condor, 1956, p. 386) as a crude platform 360 mm. (14 inches) in diameter, made of coarse twigs and roots, lined with finer materials, placed 2½ meters (8 feet) from the ground in a coffee tree. The 2 somewhat glossy, creamy white eggs measured 33.7×24.9 and 32.4×25.1 mm.

While this bird evidently is related to the brown-headed *Geotrygon linearis* and its subspecies of northern South America, the adult is sufficiently different in its dark bluish gray crown to be regarded as a distinct species. The juvenile has a brown crown and is much darker throughout than the similar stage of *linearis*. *Geotrygon albifacies* and its races found from Nicaragua north to southern México differ in the specialized plumage of the neck, especially on the sides, where the feathers are somewhat narrowed, and slightly stiffened, with the outer margins faintly incurved, so that they present a more broken, imbricated surface. This group also lacks the black line across the cheeks that is found in *chiriquensis* and *linearis*.

In spite of their differences there has been confusion regarding the forms of Central America. Sclater and Salvin (Exotic Orn., Dec., 1867, p. 77, pl. 39) figured the northern bird, *albifacies* of México, under the name *chiriquensis*. They recognized the error soon, and published a correction in a subsequent part of their work (*loc. cit.*, Aug., 1868, p. 123, pl. 62) based on a specimen sent by Arcé from Veraguas.

The original description of *Geotrygon chiriquensis* was published by Sclater in a list of birds and mammals "obtained by Thomas

Bridges in an expedition, mainly for the collection of orchids, during which he had his headquarters at David, Chiriquí." Sclater gave no definite type locality, but from the statement just quoted this has been cited as David (near sea level), an error, as the bird is one of the Subtropical Zone. Sclater continues in his account, saying that Bridges' specimens "were principally collected near the town on the banks of the river, or between that and the 'Boqueti'—an elevated savannah of about 4,000 feet above sea-level, lying on the western slope of the volcano of Chiriquí." It is obvious that the type of this pigeon, a species of the Subtropical Zone, was collected in the highlands near Boquete. I have so designated the type locality in the citation at the head of this account.

The other supposed lowland record at Calobre, Veraguas, based on Arcé's specimens must refer to the hill country back of that settlement.

Ridgway in his survey of the pigeons of tropical America restricted the genus *Geotrygon* to a single species, *G. versicolor* (Lafresnaye) of Jamaica, and placed the numerous related quail-doves under the name *Oreopeleia* Reichenbach. His treatment of the group has been accepted in most subsequent publications. On examination of the characters for this action with much more extensive material the only significant structural character that is not duplicated in the two groups is found in the somewhat elongated feathers on the forehead of *versicolor*. This alone seems too slight a basis for generic separation, so that all should be united in the genus *Geotrygon*.

Order PSITTACIFORMES

Family PSITTACIDAE: Macaws, Parrots, and Parakeets;
Guacamayos, Loros, y Pericos

The parrot family primarily is a group of the tropics since it is in the warmer regions of the earth that it is most abundant. Only a few hardy kinds range in high mountain areas, or reside where winter seasons are severely cold. There are none native to Europe or northern Asia, and only one, the Carolina parakeet, now extinct, was found in eastern North America. In spite of this, several species are widely known as household pets, kept for their amusing ways, and for the imitative ability of a number of kinds through which they learn to copy human speech and other common sounds. Their normal calls in the main are harsh and strident.

The 21 species found in Panamá almost equal the number of kinds of pigeons. As individuals only one, the orange-chinned parakeet, is widely common. The larger kinds, particularly the macaws, disappear as forests are cleared, the countryside cultivated, and human occupancy grows. The species found in Panamá all nest in tree cavities. All members of the family lay white eggs.

KEY TO SPECIES OF PSITTACIDAE

1. Very small (sparrow size); wing less than 90 mm.; outer primary with inner web abruptly narrowed at tip.
Spectacled parrotlet, *Forpus conspicillatus conspicillatus*, p. 84
Larger; wing 100 mm. or more (in most much longer); outer primary with inner web normal, not narrowed at tip..... 2
2. Tail graduated; feathers narrowed and pointed..... 3
Tail even across the end, or nearly so; feathers broad throughout with rounded ends, or, if pointed at the tip, with all nearly equal in length.. 12
3. Side of head bare, or with scattered feathers arranged in narrow, curving, separated lines; larger, wing 225 mm. or more (genus *Ara*)..... 4
Cheeks feathered, only the space around the eye bare; smaller, wing less than 175 mm. 7
4. Under surface of body green
Darker green on lower surface; under side of tail red; smaller, wing less than 250 mm. Chestnut-fronted macaw, *Ara severa*, p. 72
Yellowish green on lower surface; under side of tail greenish yellow; larger, wing more than 350 mm. Green macaw, *Ara ambigua ambigua*, p. 66
Undersurface of body yellow or red..... 5
5. Undersurface of body yellow... Blue-and-yellow macaw, *Ara ararauna*, p. 65
Undersurface of body red..... 6
6. Wing coverts and scapulars banded broadly with yellow; central tail feathers bright red..... Scarlet macaw, *Ara macao*, p. 68

Entire wing green and blue, without yellow markings; central tail feathers dark red at base, blue at tip.

Red-blue-and-green macaw, *Ara chloroptera*, p. 71

7. Auricular region red; primary coverts banded with yellow.

Hoffmann's parakeet, *Pyrrhura hoffmanni gaudens*, p. 80

Auricular region without red; primary coverts not banded with yellow... 8

8. An orange spot on the throat.

Orange-chinned parakeet, *Brotojeris jugularis jugularis*, p. 86

No orange spot on the throat..... 9

9. Lesser and middle wing coverts partly black; upper surface and sides banded narrowly with dull black; size small; tail short, not more than 62 mm.

Banded parakeet, *Bolborhynchus lineola lineola*, p. 82

Without black on wing coverts, upper surface or sides..... 10

10. Upper surface of body plain green; lesser under wing coverts red, or partly red; tips of wings green..... Finsch's parakeet, *Aratinga finschi*, p. 73

Foreneck and upper breast brownish; lesser under wing coverts wholly green; tips of wings blue, or partly blue..... 11

11. Cheeks dull buffy brown; feathers around the eye yellow.

Brown-throated parakeet, *Aratinga pertinax ocularis*, p. 77

Cheeks green; feathers around the eye without yellow.

Aztec parakeet, *Aratinga astec astec*, p. 76

12. Under tail coverts extending nearly to end of tail; smaller, wing less than 122 mm., tail less than 50 mm..... 13

Under tail coverts of normal length, definitely shorter than tail; larger, wing not less than 134 mm., tail not less than 60 mm. (Both measurements much greater in most species)..... 14

13. Forehead blue..... Blue-fronted parrotlet, *Touit dilectissima*, p. 90

Forehead red..... Red-fronted parrotlet, *Touit costaricensis*, p. 88

14. Under wing coverts red, or mainly red; bend of wing yellow.

Saffron-headed parrot, *Pionopsitta pyrilia*, p. 94

Under wing coverts green, or blue; no yellow on bend of wing..... 15

15. Bend of wing, and part of lesser wing coverts, bright blue; cheeks, and sides of foreneck brownish slate to dull black.

Red-eared parrot, *Pionopsitta haematotis*, p. 91

Bend of wing, and lesser wing coverts not blue; cheeks and sides of foreneck blue or green..... 16

16. Under tail coverts partly or wholly red..... 17

Under tail coverts green or yellowish green..... 18

17. Crown and hindneck bright blue (in some spotted irregularly with red); primaries green in central area.

Blue-headed parrot, *Pionus menstruus rubrigularis*, p. 95

Front half of crown white; cheeks and hindneck dull green edged with blue; primaries blue in center..... White-crowned parrot, *Pionus senilis*, p. 98

18. Concealed base of tail green..... Mealy parrot, *Amazona farinosa*, p. 104

Concealed base of tail red, or partly red..... 19

19. Fore-crown yellow, or partly yellow; rest of crown and hindneck green.

Yellow-headed parrot, *Amazona ochrocephala panamensis*, p. 101

Forehead red; feathers of crown and hindneck tipped with blue.

Red-fronted parrot, *Amazona autumnalis salvini*, p. 100

**ARA ARARAUNA (Linnaeus): Blue-and-yellow Macaw;
Guacamayo Azul y Amarillo**

Psittacus Ararauna Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 96. (Pernambuco, Brazil.)

Large; blue above, yellow underneath.

Description.—Length 750 to 830 mm. Adult, forecrown and a line on either side light green; rest of upper surface blue, with the primaries and secondaries darker; under tail coverts dull blue; several lines across bare skin of side of head, and a broad band across fore-neck dull olivaceous black; rest of under surface, including the under wing coverts, orange-yellow; under surface of primaries, secondaries, and tail yellow, varying to olivaceous with changing angle of view.

Immature, like the adult, except for brownish gray on wing coverts and upper tail coverts; under tail coverts duller blue, tipped with orange-yellow.

Iris yellow; bill black; bare skin of side of head white; tarsus, toes, and claws black.

Measurements.—Males (8 from Darién, Colombia, and Venezuela), wing 360-392 (379.7), tail 424-513 (471.1), culmen from cere 61.0-68.8 (66.2), tarsus 33.7-37.7 (36.1) mm.

Females (5 from Darién, Colombia, and Venezuela), wing 349-393 (368.4), tail 395-553 (441.4), culmen from cere 58.5-64.5 (61.7), tarsus 33.0-36.4 (35.1) mm.

Resident. Local, in small numbers, in the less settled areas from the upper Río Bayano to eastern Darién (mainly in the drainage of the Tuira and Chucunaque Rivers); Cerro Pirre.

For many years the only published report of this macaw for Panamá was of one from Chepo sent by Arcé to Osbert Salvin in 1864, a specimen now in the British Museum. It was, therefore, a pleasant surprise in 1959 to find them fairly common in the Tuira Valley at Boca de Paya, and along the Río Chucunaque near the mouth of the Tuquesa. In January 1961, I recorded them on Cerro Pirre, and in 1964 noted them occasionally at Pucro, and higher up on the Río Tacarcuna. One of my memories is of an early morning journey in a small plane, when between El Real and La Palma we passed over a pair of these macaws in flight with the blue of their backs and wings showing clearly in the slanting rays of the rising sun, against the green of the forest. They still remain along the upper Río Bayano, as through Eustorgio Méndez I have examined a male killed January 20, 1966, about 50 kilometers above Chepo.

At Boca de Paya blue-and-yellow macaws passed regularly over our camp, especially in the early morning flight, their coming advertised by their raucous calls. Usually they were in pairs, though once I saw 8 in company, divided in two groups of 3 and one of 2, but near together. I assumed that the third individual in this instance was an immature bird still with its parents. The Chocó Indians and the Panamanian countrymen considered their flesh a delicacy and shot them to eat, though to me the usual pungent macaw odor, that seemed stronger in this species than in others, was repulsive.

The long tails have broad webs to the tip when new, but the ends and the wing tips become much abraded in the breeding season from their nesting holes. I saw pairs occasionally at cavities near the tops of tall dead trees.

According to Schönwetter (Handb. Ool., pt. 9, 1964, p. 516) the white eggs measure $40.6\text{--}50.7 \times 33.0\text{--}37.7$ mm.

**ARA AMBIGUA AMBIGUA (Bechstein): Green Macaw;
Guacamayo Verde**

Psittacus ambiguus Bechstein, in Latham, Allg. Uebers. Vög., vol. 4, 1811, p. 65.
(Northwestern Colombia.)

Size large, with body color green.

Description.—Length 700–770 mm. Adult (sexes alike), forehead, anterior lores, and narrow feather bands on the area, otherwise bare, in front of the eye, red; crown and sides of neck bright green; upper back, scapulars, inner wing coverts, and inner secondaries yellowish green, with a wash of yellowish olive; greater wing coverts greenish blue; primaries and outer secondaries blue with shafts black and the inner web edged with black; lower back, rump, and upper tail coverts light blue; central tail feathers red, with black shafts and blue tips, with blue increasing on the outer pairs until the outermost are entirely of this color; narrow lines of feathers on the bare area below eye black; side of occiput bright green, with hidden dull red on the bases of the feathers; a narrow line of dull black feathers tipped with dull red and green bordering the bare area on base of lower mandible; under surface of body bright green, with an olive cast; under tail coverts light blue; green feathers on lower abdomen with concealed red bases; underside of wing and tail yellow with more or less of an olive cast.

Immature, somewhat duller colored, with indistinct margins of yellowish green on scapulars and inner secondaries, duller green below; middle tail feathers margined distally with dull yellow.

A female, taken March 6, 1950, at the Quebrada Cauchero, on the base of Cerro Chucantí, had the iris dull yellow; bill dusky neutral gray, becoming horn color on the culmen and sides of the maxilla; bare skin on sides of head, and cere dull rose, changing to yellowish white on the throat; scutes on tarsi and toes dusky neutral gray, with the spaces between fuscous; claws dusky neutral gray.

Measurements.—Males (7 from Costa Rica, Panamá, and Colombia), wing 366-397 (390), tail 387-481 (430), culmen from cere 64.8-74.0 (70.4), tarsus 35.5-38.8 (37.5) mm.

Females (5 from Costa Rica, Panamá, and Colombia), wing 366-405 (385), tail 362-439 (402), culmen from cere 69.5-74.0 (71.0), tarsus 34.4-38.2 (36.2) mm.

Resident. Local, in Tropical and Subtropical Zone forests.

Recent records are as follows: Bocas del Toro (above Almirante, numerous, 1960); western Los Santos (hills above Las Palmitas, 1962); eastern Panamá Province (upper Chagres Valley, above Peluca on the Río Pequení, 1961; lower Río Bayano, above Cañita, 1962; above Chimán, Majé, Charco del Toro, Cerro Chucantí, 1950); Darién (Cerro Pirre, 1961); Cerro Malí, Río Tacarcuna, La Laguna, 1963; Río Jaqué, 1947.

Salvin (Proc. Zool. Soc. London 1870, p. 213), recorded specimens taken by Arcé in the hill country at Calovévora, Veraguas; and Sclater and Salvin (Proc. Zool. Soc. London, 1864, p. 368) received others from McLeannan collected near the lower Chagres. Possibly it was this species that Goldman saw flying at a distance in 1911 at the Gatun Dam when it was under construction. This is the latest report that has come to me of macaws in the Canal Zone.

These great birds now are found in Panamá only in remote forested areas. The usual view of them is of pairs in flight to and from feeding grounds in the morning and evening. When the region is not inhabited, the birds often are tame so that they allow close approach. On Cerro Pirre they came regularly around our camp. Here they ranged in the high tree crown and showed little fear, as there had been only casual human penetration of this region in recent years. In April 1947, I recorded them regularly in the hill country on the upper Río Jaqué. Griscom (Amer. Mus. Nov., no. 282, 1927, p. 4) reported 3 pairs seen at Garachiné. In January 1962, I saw pairs twice over the hills back of Las Palmitas in the Río Guánico Valley in southwestern Los Santos.

The earliest account of this genus of parrots in Panamá, that of Lionel Wafer (Isthmus of America, 1699, pp. 116-117), a composite

of all of the larger species, may be quoted here for its interest. He wrote that "*Macaw*-birds are here also in good plenty. 'Tis shap'd not much unlike a Parrot, but is as large again as the biggest of them. It has a Bill like a Hawk's; and a bushy Tail, with two or three long stragling Feathers, all Red or Blue: The Feathers all over the Body are of several very bright and lovely Colours, Blue, Green and Red. The Pinions of the Wings of some of them are all Red, of others all Blue, and the Beaks yellow. They make a great Noise in a Morning, very hoarse and deep, like Men who speak much in the Throat. The *Indians* keep these Birds tame, as we do Parrots, or Mag-pies: But after they have kept them close sometime, and taught them to speak some Words in their Language, they suffer them to go abroad in the Day-time into the Woods, among the wild ones; from whence they will on their own accord return in the Evening to the *Indian's* Houses or Plantations, and give notice of their arrival by their fluttering and prating. They will exactly imitate the *Indian's* Voices, and their way of Singing, and they will call the *Chicaly-Chicaly* in its own Note, as exactly as the *Indians* themselves, whom I have observ'd to be very expert at it. 'Tis the most beautiful and pleasant Bird, that ever I saw; and the Flesh is sweet-tasted enough, but black and tough."

The typical subspecies ranges from Nicaragua south through Costa Rica, and Panamá to northwestern Colombia. Schönwetter (Handb. Ool., pt. 9, 1964, p. 516) lists the size of an egg in the Nehrkorn collection as 55×46 mm. Another race *A. a. guayaquilensis* Chapman has been described from western Ecuador.

ARA MACAO (Linnaeus): Scarlet Macaw; Guacamayo Bandera

FIGURE 8

Psittacus Macao Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 96. (Lower Amazonas, Brazil.)

A large macaw, red on head and lower surface of body, with a prominent band of yellow across the inner greater wing coverts, scapulars, and tertials; feather lines across bare side of head reduced to filaments.

Description.—Length 800-960 mm. Adult (sexes alike), head, hind-neck, upper back, and lesser and middle wing coverts bright red, with the outer wing coverts tipped with dark green; lower back, rump, and upper tail coverts bright blue, bordered narrowly with olive-green to olive-yellow; inner greater wing coverts, inner secondaries, and tertials orange-yellow to bright yellow, tipped with green; primary coverts, alula, primaries, and outer secondaries deep blue, with the shafts and

inner margins of the webs black; central tail feathers red, with some blue at tips, others red basally with dark blue tips; under surface of body red; under tail coverts light blue; under wing coverts red; underside of flight feathers olive-green on inner webs, red on outer webs; underside of tail red.



FIGURE 8.—Scarlet macaw, guacamayo bandera, *Ara macao*.

Iris dark yellow; maxilla dull yellowish white, horn color at base of culmen, elongated tip and lower side at base black; sides of mandible black, with the broad gonys dull neutral gray; bare skin of side of head and throat cream-white, with a hint of light rose color; front of tarsus and toes dull fuscous-black, with back of tarsus dull buff.

Measurements.—Males (5 from México, Costa Rica, Panamá, and Colombia) wing 372-410 (385), tail 447-561 (494), culmen from cere 64.2-72.4 (69.0), tarsus 34.7-38.6 (37.0) mm.

Females (5 from Guatemala, Costa Rica, Panamá, Colombia, and Venezuela), wing 347-395 (375), tail 470-590 (512), culmen from cere 61.2-69.5 (65.2), tarsus 32.8-38.3 (35.3) mm.

Resident. In early days present on the Caribbean slope of the Canal Zone, and on the Pacific side in western Chiriquí (Bugaba, Divalá); in recent years restricted to Isla Coiba, and the lower end of the Azuero Peninsula in southwestern Los Santos; recorded also on Isla Ranchería (1956) and Isla Canal de Afuera (1962).

Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 8, 1863, p. 11) received a pair from McLeannan from Lion Hill, Canal Zone. Bangs (Auk, 1901, p. 358) reported a male taken by Brown December 1, 1900, at Divalá, western Chiriquí, and (Proc. New England Zool. Club, 1902, p. 24) another collected at Bugaba, July 11, 1901. In March 1957, I found this species in the mangroves at the mouth of the Río Tonosí. In January 1962, I was told at Las Palmitas, on the Río Guánico, that they were seen there at times. On February 12, 1966, one was reported to me on the upper Río Corotú, adjacent to the forested hills on the boundary with Costa Rica, west of Puerto Armuelles, Chiriquí.

This handsome bird long has been common on Isla Coiba where J. H. Batty collected a series between April and June 1901, part of the specimens being now in the American Museum of Natural History, and part in the Chicago Natural History Museum. Two in the British Museum were collected there September 3, 1924, by naturalists on the St. George Expedition.

In 1956, when I lived at the Colonia Central on Bahía Damas, each morning, when the sun had risen, groups, traveling in pairs, came over the forest and pasturelands from the south. Each evening toward sunset they returned, crossing to a roosting place in the southern part of the island. They flew with steady wing beat, the long tails streaming behind, an attractive sight in silhouette, and doubly so when the slanting rays of the sun lighted their brilliant colors. During the day I found small bands in the forest feeding on figs and other fruits in the high tree crown. Sometimes they were tame and sometimes wary, but always noisy with raucous calls. In early February occasional pairs were followed by a third bird, as young with tails not fully grown began to accompany their parents. Their flights were extensive, as I saw several on Isla Ranchería. They may cross at times to the main-

land, as in March 1962, when traveling by launch, I saw pairs on two occasions on Isla Canal de Afuera, where they alighted briefly in the high trees on the summit of the island. Range in egg size, according to Schönwetter (Handb. Ool., pt. 9, 1964, p. 516), is $43.7\text{--}52.3 \times 33\text{--}37$ mm.

**ARA CHLOROPTERA G. R. Gray: Red-blue-and-green Macaw;
Guacamayo Rojo**

Ara chloroptera G. R. Gray, List Birds Brit. Mus., Psittacidae, 1859, p. 26.
(Guiana.)

A large macaw, red on head and lower surface of body, with a prominent band of green across the inner wing coverts, scapulars, and tertials; bill very large.

Description.—Length 730 to 950 mm. Adult (sexes alike), head, narrow feather lines across bare surface of side of head, neck, extreme upper back and upper lesser wing coverts red; middle coverts, inner secondaries, tertials, and scapulars green, forming a broad band; lesser wing coverts green on hidden bases; back, rump, and upper tail coverts light blue; greater coverts and secondaries blue; primaries dark blue with inner web margined with black; central tail feathers dark red tipped with blue; outer pairs blue, more or less red basally; longer feathers on tibia tipped with green; under tail coverts blue; under surface of wing and tail dark red.

A male, taken at Armila, San Blas, February 23, 1963, had the iris light yellow; cutting edge of maxilla and all of mandible black; rest of maxilla ivory-white; bare skin on side of head white; tarsus, toes, and claws black; under surface of toe pads dull honey yellow.

Measurements.—Males (4 from Panamá, Colombia, and Venezuela) wing 381-410 (392), tail 366-579 (462), culmen from cere 79.4-88.4 (81.9), tarsus 34.5-40.6 (38.2) mm.

Females (6 from Colombia and Brazil), wing 370-407 (390), tail 351-510 (417), culmen from cere 76.5-84.2 (78.9), tarsus 35.2-40.0 (37.4) mm.

Resident. Found locally in the hill country of eastern Panamá. Recorded in recent years from Darién and eastern San Blas; formerly west to the northern Canal Zone.

Slater and Salvin (Proc. Zool. Soc. London, 1864, p. 367) list this bird as received from McLeannan from Lion Hill, in what is now the Canal Zone. Two specimens on which this record is based, now in the British Museum (Natural History), are the only records from this locality. The Vanderbilt Expedition of 1941 secured 1 on Cerro Sapo

above Garachiné, and we have 1 taken on June 12, 1912, by E. A. Goldman at 900 meters above Cana on Cerro Pirre. Other records are of birds taken by Wedel at Permé and Puerto Obaldía, San Blas. In February and early March 1963, I saw them daily near our camp on the Quebrada Venado back of Armila in this area, and secured 2 males, taken February 23 and 25. My usual note of them was of pairs flying over the high forest with strong wing strokes, often calling with the raucous notes usual in macaws. On March 16, I recorded 2 pairs back of Puerto Obaldía. The following year I saw a pair on March 9, at our camp at 580 meters elevation on the Río Tacarcuna, Darién. A female was collected on Cerro Malí, June 3, 1963, by Dr. Pedro Galindo.

The bill in this species is notably large, with the distal end of the maxilla elongated and slender. The tip of the long tail is subject to much wear. The species ranges widely in South America from Colombia southward.

According to Schönwetter (Handb. Ool., pt. 9, 1964, p. 516) eggs measure $47\text{-}53 \times 33\text{-}37$ mm.

ARA SEVERA (Linnaeus): Chestnut-fronted Macaw; Guaquita

Psittacus severus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 97. (Amazon River.)

Smallest of the macaws found in Panamá; green with a narrow band of dull chestnut on the forehead.

Description.—Length 400-490 mm. Adult (sexes alike), forehead and narrow line bordering bare throat dull chestnut; crown and upper hindneck green with a faint bluish cast; back, rump, upper tail coverts, lesser wing coverts, tertials, and entire under surface green; alula, primaries, and inner secondaries blue, tipped and margined on the inner web with dull black; inner secondaries also blue, but margined externally with green; central rectrices yellowish green, with the shafts dull red basally; outer pairs blue with dull red on inner webs; outer lesser under wing coverts red, inner ones, and a line through the outer ones, green; under greater coverts dull reddish brown; underside of wing dull red, with a border of fuscous-black on both webs and tip; underside of tail dull red; feathers of tibia dull red basally; lines of tiny feathers on bare side of head dull black to dull chestnut.

A male shot at Pucro, Darién, January 29, 1964, had the iris pale orange; bare skin of face and side of head pale ivory-white; bill black; inside of mouth black; scutes of tarsus and toes dull fuscous-black, with spaces between brownish gray; claws black.

Measurements.—Males (8 specimens from Panamá and Colombia), wing 227-241 (234.4), tail 191-242 (222), culmen from cere 36.7-41.6 (39.2), tarsus 21.8-27.6 (24.3) mm.

Females (8 from Panamá and Colombia), wing 220-241 (230), tail 190-245 (218, average of 7), culmen from cere 36.4-39.8 (38.1), tarsus 21.1-24.7 (23.3) mm.

Resident. Locally fairly common in the Tropical Zone of Darién, especially in the middle and upper valleys of the Río Tuira (Río Setegantí on Cerro Pirre, Boca de Paya, Pucro), and the Río Chucunaque (mouth of Río Tuquesa). Formerly found in the northern Canal Zone (Lion Hill).

The only record outside eastern Darién is of a bird McLeannan forwarded when he was stationed at Lion Hill (Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1862, p. 474). I found them fairly common in 1959 near the mouth of the Río Paya, in 1961 on the forested slopes of Cerro Pirre, and in 1964 on the Río Pucro. They were seen usually in pairs in morning and late afternoon flight over the forest. Occasionally small groups fed on figs in the high tree crown, where they clambered about slowly, often hidden among the leaves. Their voices are higher pitched than those of the larger species, and have a drawling, somewhat complaining tone. Occasionally, from early February to early March I saw pairs about holes high in dead trees. A female taken at Boca de Paya on February 26 was laying. An egg in the Nehrkorn collection measures 38.4×30.4 (Schönwetter, Handb. Ool., pt. 9, 1964, p. 516).

Bangs and Penard (Bull. Mus. Comp. Zool., vol. 62, 1918, p. 47) separated the birds of northwestern South America as a race *castaneifrons* Lafresnaye (1847) on supposed larger size, but our series from Panamá and Colombia includes the dimensions that they cite for their specimens from Guiana. The type locality of *Psittacus severus* Linnaeus was designated by Hellmayr in 1906 as the "Amazon River," which antedates the proposal for "Colombia" of Brabourne and Chubb (Birds South Amer., 1912, p. 80).

**ARATINGA FINSCHI (Salvin): Finsch's Parakeet;
Perico Frentirrojo**

Conurus finschi Salvin, Ibis, ser. 3, vol. 1, January 1871, p. 91, pl. 4. (Bugaba, Chiriquí, Panamá.)

Largest of the parakeets of Panamá; green, with red forehead; immature birds often lack the red.

Description.—Length 250-270 mm. Adult (sexes alike), forehead

and anterior loreal area red; rest of upper surface green; under surface yellowish green; under wing coverts and edge of wing red, in some mixed with orange; under primary coverts yellow; under surface of flight feathers and of tail yellowish olive; lower end of tibia red.

Immature, red of forehead much reduced, absent in some; red of under wing coverts much reduced; no red on tibia; otherwise like adult.

A male taken at Puerto Armuelles, Chiriquí, February 17, 1966, had the iris orange; bill buff; bare space around eye yellowish white; eyelids pale dull grayish green, with the rim grayish brown; bill light brownish white; cutting edge and tip of maxilla dull grayish brown; a narrow line of bare skin around base of maxilla white; bare skin bordering mandible and point of chin pale dull honey yellow; tarsus and toes fuscous; claws fuscous-black.

Measurements.—Males (10 from Costa Rica and Panamá), wing 152-167 (158.6), tail 123.4-135.8 (128.9, average of 9), culmen from cere 23.4-27.7 (25.3), tarsus 19.0-19.8 (19.4) mm.

Females (10 from Costa Rica and Panamá), wing 150-162 (155.2), tail 118.2-132.7 (125.4, average of 8), culmen from cere 22.2-25.3 (23.9), tarsus 17.0-18.7 (18.1) mm.

Resident. Distributed locally, in the Tropical and lower Subtropical Zones in western Panamá, in Chiriquí (Puerto Armuelles, Divalá, Bugaba, Buena Vista, ranging above Boquete in the lower Subtropical Zone to 1,600 meters); western Veraguas (Soná); and western Bocas del Toro (Almirante, Changuinola).

These are forest birds that have been comparatively little known in Panamá until recent years, though the species was described by Salvin from 3 specimens collected 100 years ago by Arcé at Bugaba. Bangs (Auk, 1901, pp. 358-359) recorded 2 taken by Brown at Divalá in December 1900. Mönniche secured several above Boquete, and there is a series from Quiel at 1,600 meters, in the U.S. National Museum, taken by R. R. Benson, in November 1931. In March 1960, when I was living at Buena Vista, at 600 meters elevation, above Concepción, small flocks came each evening to roost in clumps of tall bamboo, and left in the morning with the usual chatter and confusion. They shifted their sleeping quarters at intervals, apparently if disturbed at night. Near Puerto Armuelles, in February and March 1966, I found them occasionally feeding in fields where corn had been harvested. Each evening small bands came to sleep in the palms scattered through the residence area of the Chiriqui Land Company in the town. When hawks passed near at sunset the parakeets flew out in screeching flocks.

Near Soná, Veraguas, in June 1953, I collected several in scattered tracts of forest, the first report of the species from this province.

These parakeets have been better known from the Almirante region in western Bocas del Toro, where Kennard secured 3 in February 1926, and von Wedel forwarded 2 others taken later. From mid-January to early March 1958, in Almirante, scores came each evening to roost in the palms in the residence area. They began to arrive at sunset in pairs and small flocks with much shrill chatter, a body of noise that increased steadily as more birds appeared. There was much activity among them until dark, as they fluttered and climbed about. Lone birds hung head down at the ends of long palm fronds, swinging about, and occasionally changing to cling with the bill. Others rested quietly, or dressed their feathers. Pairs at times seemed almost brutal in preening their grown young, holding a youngster between them while they pulled out its wings and nibbled at the feathers on various parts of its body. At dark they became quiet, except for an occasional note, until at dawn their chattering began again, increasing at sunrise when they started off in pairs and groups to their feeding grounds. In an hour the last had flown, and none were seen through the day until the evening flight began. I estimated that more than 500 were present each night. Friends resident in Almirante reported that a few parakeets had been noticed in these roosts in 1944, but none were observed prior to 1940. They were said to have increased greatly in number since 1950.

Much squabbling among them takes place over roosting quarters, and I saw one parakeet driving a pale-vented pigeon out of the palms. Birds that I supposed were males, when engaged in grooming a mate often fought off intruders viciously, when these came sidling along the fronds to assist. In addition to the usual shrieking calls, they uttered a comfortable, rattling chatter that was rather froglike in tone, so much so that I listened to it for several evenings before I was certain that the sound came from the birds and not from some unknown batrachian. When heavy rains fell immediately before dawn the parakeets were far less noisy than usual, and if the morning continued gloomy most of them remained in the shelter of the palms for an hour or more after the normal time of departure. I was told that when earth tremors were felt during the night the parakeets aroused with much chattering. They were said to nest in July, when the size of the evening roost was much reduced.

In spite of the numbers that came nightly, in 2 months in the field in this region on only one occasion did I find a feeding group in the

forest during the day. It was obvious that they gathered at night from a considerable area.

**ARATINGA ASTEC ASTEC (Souancé): Aztec Parakeet;
Perico Azteco**

Conurus astec Souancé, Rev. Mag. Zool., ser. 2, vol. 9, March 1857, p. 97. (México.)

Eupsittula astec extima Griscom, Amer. Mus. Nov., no. 293, January 12, 1928, p. 2. (Almirante, Bocas del Toro.)

A small, long-tailed parakeet; green above, with a prominent longitudinal blue band in the wing.

Description.—Length 230-250 mm. Adult (sexes alike), feathered area of cere yellow to orange-red; rest of upper surface, including side of head and side of neck green, except for the distal secondaries and proximal primaries which are deep blue, tipped with black; throat and under surface with foreneck olive to buffy olive, changing to greenish olive on upper breast, and olive-yellow on lower breast and abdomen, many of the feathers with dusky shaft lines; sides, under lesser and middle wing coverts, and under tail coverts light green; under primary coverts and under surface of primaries and secondaries dull slate, or dark mouse gray; under surface of tail yellowish olive.

Iris yellow to orange; bill brownish horn color, with tips of maxilla and mandible paler; tarsus and toes fuscous to fuscous-black.

Measurements.—Males (8 from Honduras, Nicaragua, Costa Rica, and Panamá), wing 131.6-139.6 (135.7), tail 100.3-115.3 (111.0), culmen from cere 18.0-19.7 (18.8), tarsus 13.2-14.2 (13.8) mm.

Females (7 from Honduras, Nicaragua, and Panamá), wing 129.6-134.9 (131.6), tail 94.4-116.9 (103.4), culmen from cere 15.6-18.8 (17.5), tarsus 13.5-14.3 (14.0) mm.

Found in the Tropical Zone of western Bocas del Toro. Known only from Almirante, and the Río Changuinola.

The first specimen of this bird taken in Panamá was collected at Farm 3 on Río Changuinola April 15, 1927, by Austin Paul Smith. This bird is in the Havemeyer collection in the Peabody Museum at Yale. On August 24 of the same year Rex Benson secured 2 males at Almirante, and on October 3 Hasso von Wedel shot a female at Changuinola. Griscom described the Benson specimens as a separate race *extima*, but with more material from farther north the supposed differences in darker color on the lower surface prove to be merely individual variation.

It is suggestive to note that the 4 specimens recorded to date from Panamá were taken between April and October in the same year. Possibly they were wanderers from farther north.

ARATINGA PERTINAX OCULARIS (Sclater and Salvin):
Brown-throated Parakeet; Perico Carisucia

FIGURE 9

Conurus ocularis P. L. Sclater and Osbert Salvin, Proc. Zool. Soc. London, 1864, p. 367. (Near Panama City, Panamá.)

Green, with blue-tipped wings, side of head and upper breast buffy brown; an orange-yellow band around the eye.

Description.—Length 220-245 mm. Adult (sexes alike), crown bluish green (in some this color faint); rest of upper surface green, except for the distal secondaries and inner primaries, which are dull blue or greenish blue at the ends; ends of the outer primaries dusky black; a narrow space in front of eye, and a broader area below, extending back to a point above the ear coverts, orange-yellow; sides of head, including lores, buffy brown, the buff tinge increasing on the foreneck and upper breast; rest of under surface light yellowish green, becoming more yellow on the abdomen; under surface of tail olive-yellow; under surface of flight feathers and under greater wing coverts slate color; smaller under wing coverts light green.

Immature, foreneck and upper breast usually greener than in adult; no orange-yellow around the eye.

A male taken at El Potrero, Coclé, March 5, 1962, had the iris light yellow; somewhat wrinkled bare skin around eye very pale buffy white, with the spaces between the corrugations pale greenish white; cere and bare throat pale brownish gray; gonys pale brownish gray; rest of bill fuscous-black; tarsus and toes dusky neutral gray, with the spaces between the scutes dull whitish; claws black. Another of this sex shot at Olivo near Puerto Armuelles, Chiriquí, March 7, 1966, had the iris orange-yellow.

A female collected near Aguadulce, Coclé, January 19, 1963, had the iris slightly orange-yellow; cere and the bare throat dull brownish white; bare skin around eye pale yellowish white; bill dark mouse brown; tarsus and toes fuscous-brown, with the spaces between the scutes dull white; claws black.

Measurements.—Males (10 from Panamá), wing 130.6-139.7 (134.1), tail 94.8-113.0 (102.2), culmen from cere 18.7-19.6 (19.2), tarsus 14.0-14.3 (14.1) mm.

Females (10 from Panamá), wing 129.4-137.9 (133.3), tail 95.0-115.2 (103.0), culmen from cere 18.4-19.7 (18.8), tarsus 12.9-14.4 (13.8) mm.

Resident. Locally common in the Pacific lowlands from western Chiriquí (Puerto Armuelles, Divalá, Concepción), east through Veraguas (Soná, Calobre, Paracoté), the eastern slope of the Azuero Peninsula (south to Pedasí and Tonosí), and Coclé (El Potrero, Aguadulce, Antón, Penonomé) to the western sector of the Province of Panamá (east to Bejuco) ; formerly apparently casual near Panamá

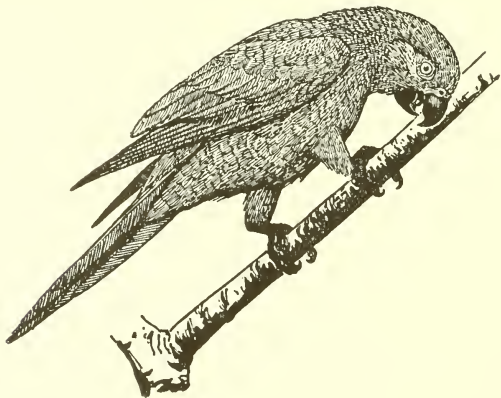


FIGURE 9.—Brown-throated parakeet, perico carisucia, *Aratinga pertinax ocularis*.

City (specimens taken by McLeannan and Galbraith winter of 1860-1861).

These are birds of the western savanna area seen in pairs or little flocks, usually in flight, and less often resting among groves of low trees. Usually they call as they pass, a chatter similar to that of the little *perico común*, but louder. The longer, pointed tail in addition to large size identifies them easily from the smaller species mentioned. They are tame, especially when they have found food in the form of small drupes.

They are kept as pets, though not as regularly as is the case with the smaller species. The name *perico carisucia* is the common appellation for all races of the species throughout the range across northern

Colombia and Venezuela. In Panamá they are known also as *perico moreno*, *perico pico negro*, or simply *piquiprieto*.

They must sleep in holes as the tails in most of those I have handled have been badly worn. Specimens taken near Soná at the end of May were in molt.

The scientific name *ocularis* was given to this parakeet by Sclater and Salvin in 1864, with the statement that "Mr. McLeannan has sent a pair of this species apparently adult." The type, now in the British Museum (Natural History) is marked "♂, Isthmus of Panama, McLeannan 128" on the usual type of label of the Salvin-Godman collection. As McLeannan at the time was track-master at Lion Hill on the Panama Railway, this has led to misconception as to the type locality. In an earlier report Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 7, 1861, p. 333) included a pair of these birds under the name "*Conurus pertinax*" in an account of birds collected by McLeannan and John R. Galbraith in the winter of 1860-1861. Lawrence stated specifically that, while most of the specimens forwarded by these two collectors were taken on the Atlantic slope of the Isthmus, 6 species were secured "on the western slope, and in the vicinity of Panama." Among these 6 Lawrence included the one that he called *Conurus pertinax*. The only comment on the parakeet is a note that in them "there is a distinct oblong yellow spot under the eye." Another of the 6 species listed from the Pacific side is the pipit, which was said to be "found on the Savannahs near Panama." It might be supposed that the parakeets were captives offered for sale in the Panamá market, but this is discounted by 2 skins of the parakeet, male and female, in the U.S. National Museum received from McLeannan labeled "Panama McL. 1862" both of which show holes made by fine shot in the bill. The indication is that while this parakeet has not been found recently east of the base of Cerro Campana, a hundred years ago it appears to have ranged to the open lands around Panamá City. The Atlantic slope of what is now the Canal Zone in the area readily accessible in McLeannan's day had a cover of rain forest with the only open stretches those over and along streams and swampy ponds, or manmade clearings, habitat obviously not suited to this parakeet of the open savanna lands. It seems reasonable to designate the type locality as near Panama City from the information available.

Related parakeets range widely in northern South America, where several forms exist. These vary in color, particularly in the presence, amount, or absence of yellow on the head. On close examination, the feathers of the auricular region in these South American populations

are weakly specialized in slender form, especially at the tips. The plumage of this area in the race of western Panamá, does not show this difference.

Two eggs of this race from western Panamá measure $26.8-27.5 \times 22.0-22.6$ mm., according to Schönwetter (Handb. Ool., pt. 9, 1964, p. 517).

PYRRHURA HOFFMANNI GAUDENS Bangs: Hoffmann's
Parakeet; Catana

Pyrrhura hoffmanni gaudens Bangs, Proc. Biol. Soc. Washington, vol. 19, July 30, 1906, p. 103. (Boquete, Chiriquí, Panamá.)

A slender, long-tailed parakeet; green, with red cheeks, and a more or less hidden yellow spot in the wing.

Description.—Length 225-245 mm. Adult (sexes alike), general coloration green; auricular region deep red; crown and hindneck with indistinct streaks and spotting of greenish yellow, tipped obscurely with dull red; in some, feathers of foreneck and upper breast obscurely edged with dull greenish orange, or greenish yellow, and the throat bordered indefinitely with dull red; primaries and secondaries with a yellow central band, mainly on the inner webs of the secondaries, on the primaries largely concealed by the green coverts; tenth outermost primary distally dull black, with a faint sheen of dull green on the outer web; seventh to ninth primaries dull black distally, with the outer web blue along the shaft, bordered externally with green; edge of wing yellow in some, green in others; lesser under wing coverts green; greater under wing coverts greenish yellow, tipped with dull neutral gray; under surface of remiges centrally greenish yellow to yellow, dusky at tips; under surface of tail reddish.

A female taken near El Volcán on February 26, 1965, had the iris pale grayish white; bare skin around eye dull white; bill and cere very pale brownish white; tarsus, toes, and claws dull brownish neutral gray.

Measurements.—Males (10 from Chiriquí), wing 130.7-140.1 (133.9), tail 95.2-136.8 (107.3), culmen from cere 16.2-18.0 (17.4), tarsus 14.1-14.9 (14.4) mm.

Females (10 from Chiriquí), wing 127.0-137.8 (130.7), tail 90.5-113.0 (105.5), culmen from cere 16.3-17.3 (16.7), tarsus 14.1-14.5 (14.2) mm.

Resident. Found in the Subtropical Zone in the mountains in western Chiriquí, and on the Caribbean slope in Bocas del Toro.

The Panamanian range of this little parakeet is along the middle elevations of the great Chiriquí volcano, including Cerro Pando and the westward spurs to the Quebrada Santa Clara. I have found it especially on the slopes and level lands through which the Río Chiriquí Viejo meanders, from Barriles and Palo Santo to above Cerro Punta, and the higher elevations on Cerro Pando. It is recorded also from the higher ridges above Boquete, and down to 500 meters elevation along the trail that leads to the Laguna de Chiriquí. The only lowland record is one secured by Hasso von Wedel for the Museum of Comparative Zoology near Cricamola, February 15, 1928. At higher elevations the most eastern records are of one from Cerro Horqueta taken by Mrs. Davidson, February 10, 1934, and a series from Quiel secured by R. R. Benson in November 1931. The basis for reports from farther east to Veraguas dates from an early mention by Salvin (Ibis, 1871, p. 93) of specimens sent by Arcé from the "Highlands of Veragua," which in this instance certainly means the Boquete area. On that early date the western region across to Costa Rica was included in the general term of Veragua, the modern designations of Chiriquí and Veraguas coming later.

Mönniche recorded them from 1,550 to nearly 2,000 meters. Above Cerro Punta I found them ranging equally high, and on Pando to 2,430 meters. This seems to be about their normal limit though they have been reported to 3,000 meters. It is common to see them in pairs or small flocks in swift flight through open tree growth. They call with a rapid high-pitched chatter that resembles that of the *perico piquiblanco* but is louder. As they pass they often show a flash of color from the red cheeks, or if directly overhead the light wing band may appear as a translucent bar. Usually they are rather wild, but occasionally, when feeding in fruit-bearing trees, they are quite heedless of disturbance. At such times I have shot smaller birds within a few meters of them without causing them to stop eating.

The race *gaudens* differs only slightly from the typical form of Hoffman's parakeet, found in the Candelaria and Dota mountains of central Costa Rica. In the bird of Panamá the greenish yellow markings on the crown and hindneck are more abundant, and are mixed with a varying amount of dull red to orange-red. In a few individuals these markings are more extensive and may appear as edgings on the feathers of the back, foreneck, and chest. The series of specimens now at hand show that size is similar in both forms. Some juvenile birds in the two do not differ.

The specific name *hoffmanni* was given in honor of Dr. A. Hoff-

mann, a German naturalist who made extensive collections in Costa Rica.

BOLBORHYNCHUS LINEOLA LINEOLA (Cassin):
Banded Parakeet; Perico Fajeado

FIGURE 10

Psittacula lineola Cassin, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, 1853, p. 372.
(Puente Nacional, Veracruz, México.)

A small green parakeet, with dark bars on back and sides, and black on the bend of the wing.

Description.—Length 150-165 mm. Adult (sexes alike), green above, with the forehead somewhat yellowish green; feathers on back of crown, hindneck, back, rump, and upper tail coverts tipped lightly with dull black to produce transverse bars; lesser wing coverts black; middle and greater coverts with tips spotted boldly with black; outermost primary black, edged narrowly with buff; rest of primaries and primary coverts black, edged externally with green; upper surface of tail tipped with black; under surface, including cheeks, yellowish green, with the sides barred somewhat indistinctly with black; flanks more heavily marked with black, and a few small black tips on under tail coverts; under wing coverts green, spotted, and barred indistinctly with black; under surface of wing and tail bluish green.

Labels on skins from Costa Rica list the iris as dark brown; bill dull flesh color to ivory, in some with the mandible somewhat darker; tarsus flesh color.

Measurements.—Males (7 from Honduras, Costa Rica, and Chiriquí), wing 100.5-109.8 (104.3), tail 53.8-62.0 (58.5), culmen from cere 11.6-13.5 (12.2), tarsus 11.5-13.8 (12.4) mm.

Females (10 from Honduras, Costa Rica, and Chiriquí), wing 97.0-107.6 (102.4), tail 52.0-59.6 (55.8), culmen from cere 11.8-12.6 (11.9), tarsus 11.5-13.4 (12.4) mm.

Resident. Found in the Subtropical Zone on the Volcán de Chiriquí, on both Pacific and Caribbean slopes.

This is a forest species, local in occurrence, recorded to the present only in small numbers. It was first reported in Panamá from specimens forwarded by Arcé to Salvin, supposedly taken in the vicinity of Boquete. The species was found next by W. W. Brown, Jr., who sent 2 males taken June 12, 1901, at 600 meters elevation on the Caribbean slope of the volcano, to Outram Bangs (Proc. New England Zool. Club, vol. 3, 1902, p. 25). Mönniche collected a pair at Lérida December 6 and 22, 1939, at 1,675 meters. Dr. Frank Hartman sent me a

female collected February 14, 1949, on Cerro Copete, at 2,100 meters above Lérída.

On February 6, 1960, at 1,500 meters on the Silla de Cerro Pando, west of El Volcán, Chiriquí, I found a small group feeding quietly in the tree crown in the forest, where they were detected with difficulty as they remained hidden among the green leaves. Attention was drawn to them by their notes, which in part resemble the chatter of

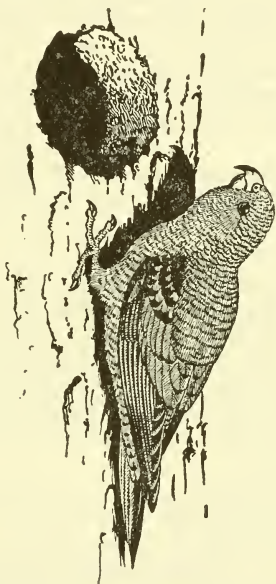


FIGURE 10.—Banded parakeet, perico fajeadó, *Bolborhynchus lineola lineola*.

the common orange-chinned parakeet, but in part were varied and more musical. Three were collected. Several others were seen at this spot 2 days later, and then they disappeared. In preparing my specimens I found the feathers to be very loosely attached, so that it was necessary to use care not to damage them.

Several specimens in collections labeled "Veragua" have led to some confusion with Veraguas which is outside the known range. One in the American Museum of Natural History, collected by Enrique Arcé, was received from Salvin. Four others obtained from Batty bear a

cardboard slip with Batty's name, the dates March 5 and 6, 1901, and the notation "Chitra, Colombia, D. Arce" These apparently are part of a lot of specimens obtained from Arcé on which Batty placed his own labels. I do not accept the locality as valid. Two in the British Museum (Natural History) collections marked "Veragua" were recorded by Salvin and Godman (Biol. Centr. Amer., Aves, vol. 2, 1897, p. 580) as "Volcan de Chiriqui (Arce)." The measurements of an egg in the Nehrkorn collection, given as 19.5×19.2 mm. by Schönwetter (Handb. Ool., pt. 9, 1964, p. 519), must be wrong, as the long diameter is too small for a bird of this size.

The typical race ranges from southern México irregularly through the mountains of Central America to the Volcán de Chiriquí. Other subspecies are found in northwestern South America.

FORPUS CONSPICILLATUS CONSPICILLATUS (Lafresnaye);
Spectacled Parrotlet; Perico de Veranillo

Psittacula conspicillata Lafresnaye, Rev. Zool., vol. 11, June 1848, p. 172.
(Honda, Tolima, Colombia.)

A tiny green parakeet, of sparrow size.

Description.—Length 110-125 mm. Adult male, general coloration green, brighter on the forehead, yellowish green on lower surface; circle around eye extended back to auricular region light blue; outer wing coverts, primary coverts, lower back, and under wing coverts (except as noted) dark blue; under primary coverts, and under surface of wing bluish green, except that the outer primary and the tips of others are dull black.

Female, without the blue markings of the male; lighter green above; much more yellowish green below.

An adult male taken at Pucro, Darién, February 8, 1964, had the iris dark mouse brown; bare skin around eye dull light brownish gray; cere pale buffy brown; cutting edge of anterior half of bill mouse brown; rest of bill dull ivory; tarsus and toes dull brownish buff; claws dull neutral gray.

A female companion, secured at the same time, had the iris mouse brown, but was similar otherwise.

Measurements.—Males (6 from Darién), wing 75.5-77.4 (76.6), tail 34.7-38.7 (36.8), culmen from cere 10.4-11.5 (11.0), tarsus 10.0-10.4 (10.2) mm.

Females (4 from Darién), wing 73.4-76.6 (74.6), tail 33.8-36.9 (35.5), culmen from cere 10.2-11.7 (10.8), tarsus 10.0-10.1 (10.0) mm.

Resident. Found in Darién, in the lower valley of the Río Tuira. Recorded to date only from El Real, at the former village site of Tapalisa on the lower Río Pucro, and near Pucro.

W. B. Richardson collected 5 of these tiny parrots at El Real on December 31, 1914, and January 21, 1915, and another at Tapalisa on March 17, 1915.

While at Pucro village in late January and early February 1964, I made enquiry for these birds among the Cuna, but without result until on February 8 I collected a pair. Then the Indian boys recognized them under the Spanish name given above, and said that they ranged in little flocks. I found the 2 taken in low trees bordering an old ricefield. The female was laying. Near El Real I secured another pair on February 16 at the border of a field near the Río Pirre. These had the crop filled with soft grass seeds.

Four eggs of this tiny parrot from northwestern Colombia listed by Schönwetter (Handb. Ool., pt. 9, 1964, p. 519) measure $17.6-18.5 \times 15.4-16.4$ mm.

The males from Darién are very slightly more yellowish green on the lower surface, and less definitely dark green above than the average in a series from northern Colombia, but are equaled in these differences by some from elsewhere in the South American area. Females are more faintly yellowish below. Griscom (Bull. Mus. Comp. Zool., 1935, p. 314) noted this difference in the birds taken by Richardson, as he wrote "perhaps subspecifically separable." From the available specimens the distinction between the two groups seems too slight to merit name.

[FORPUS PASSERINUS SPENGELI (Hartlaub)]

Psittacula spengeli Hartlaub, Proc. Zool. Soc. London, October 1, 1885, p. 614, pl. 38, fig. 1. (Barranquilla, Atlántico, Colombia.)

The original label of a specimen in the British Museum (Natural History) received in the Tweeddale collection reads "*Psittacula* Panama (McLeannan)" with no other data. Salvadori (Cat. Birds. Brit. Mus., vol. 20, 1891, p. 250) listed it as "Panama(?) (McLeannan)." I examined this bird in July 1957 to find that it was properly identified, but that there was no further indication of locality or other data. The race is one of restricted range in the lower valley of the Río Magdalena and the nearby Caribbean coastal area in northern Colombia. There is no basis, from this one specimen of uncertain source, for its inclusion in the list of the birds of Panamá.]

BROTOGERIS JUGULARIS JUGULARIS (Müller):
Orange-chinned Parakeet; Perico Piquiblanco

Psittacus jugularis P. L. S. Müller, Vollst. Naturs. Suppl. Reg.-Band, 1776, p. 80.
(Bonda, Magdalena, Colombia.)

Psittorius subcoeruleus Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1862,
p. 475. (Lion Hill, Canal Zone.)

The small green parakeet with an orange chin spot, common in captivity.

Description.—Length 160-175 mm. Adult and immature (sexes alike), above olive-green on the upper back, bluish green on the lower back and rump; inner wing coverts dull bronze; tips of primary coverts and primaries bluish; a spot of bright orange on the throat; rest of under surface yellowish green, becoming bluish green on flanks and abdomen; smaller under wing coverts yellow; under primary coverts and under surface of wing dull greenish blue; outer web, shaft, and adjacent inner web of outer primary dull black, with outer web edged narrowly with greenish blue.

A male taken at Guánico Arriba, Los Santos, January 21, 1962, had the iris dark mouse brown; bare skin around eye dull bluish gray, becoming dull orange in front of anterior canthus; top of cere flesh color across nostrils, sides orange (like throat spot); a narrow border of bare skin at base of mandible also orange, with the bare sides of the jaw behind this flesh color; bare upper throat tinged with orange; tarsus and toes pale brownish white; claws mouse brown.

Measurements.—Males (10 from Panamá), wing 105.3-113.5 (108.9), tail 55.2-67.8 (60.9); culmen from cere 14.9-17.4 (15.8), tarsus 11.1-12.6 (12.1) mm.

Females (10 from Panamá), wing 104.0-109.0 (106.0), tail 54.7-67.0 (58.9), culmen from cere 12.9-16.1 (14.6), tarsus 11.6-13.1 (12.4) mm.

Resident. Common in the Tropical Zone. Not recorded to date from Bocas del Toro or northern Veraguas, but found elsewhere on both slopes throughout the lowlands. Isla Coiba; Isla Cébaco; Isla Taboga.

This small parakeet, known universally as the *perico*, *perico común*, or more specifically as the *perico piquiblanco*, is a familiar household pet throughout Panamá. As it is found in the lowlands wherever there are trees, either in groves, along streams in the open savannas, or in the larger stands of forest and *rastrojo*, it is one of the birds seen or heard almost daily during work in the field. Though it is more common in open country it is found also in forested areas, but is seen less often, as there it lives in the high tree crown where it is camouflaged among

the green leaves. I have found it in areas of heavy forest on the Caribbean slope of northern Coclé, at El Uracillo, and on the head of the Río Guabal, a tributary of the Río Coclé del Norte, but to date the species has not been reported from the northern slope of Veraguas, nor from Bocas del Toro. Perhaps it has been overlooked in the heavy forest cover. The *perico* is common on Isla Coiba, and I found them also on Isla Cébaco. In March 1955, there were a few around the village on Isla Taboga (possibly birds brought originally as pets from the mainland as I did not see them there in 1952). They are not recorded on islands in the Archipiélago de las Perlas. The only records from mountain areas are of 3 reported by Griscom (Bull. Mus. Comp. Zool., vol. 69, 1929, p. 159) taken by Benson near Cana, Darién.

Like most parakeets these are highly social so that though they are usually in pairs they congregate with others to form small flocks. Where food is abundant a dozen to 20 or more may range in company. These birds chatter constantly with high-pitched calls, particularly as they twist and turn in swift flight through the trees. When they alight they seem to disappear as they crouch motionless amid the green leaves that match their plumage. I have measured their flight speed by speedometer at 45 miles per hour when they were moving parallel to my car on a highway.

Small drupes are favored food, and they are nectar feeders also, particularly at such flowers as those of the guayabo. Often in handling them I have found the throat filled with the sweet fluid from such blossoms. I have seen them pulling pods of the barrigón (*Bombax*) apart to get at the small seeds, and they also eat fleshy parts of the flowers of the balsa.

In the breeding season, mainly from February to April, the pairs seek old woodpecker holes, other cavities in dead trees, or tunnels excavated in termite nests. At this time scattered birds often rest in dead trees standing in clearings. They are prolific as I have seen as many as 8 fledglings taken from 1 nest. The young are sought to be reared for pets, especially in March. In Darién it has been usual to find 3 or 4 of these juveniles walking about on the floor of the house platforms of the Chocó Indians, and to see them carried about by children everywhere. Country stores may have half a dozen to a dozen for sale, huddled quietly in the shelter of a small box. Flocks begin to congregate again in May when the young are grown, and the birds tend to remain in these companies until the next nesting season.

An abnormal specimen largely blue, taken by McLeannan at Lion Hill from a flock of normal color, was described by George N. Law-

rence under the name *subcoeruleus* from the impression that it was a distinct species. The type specimen, in the American Museum of Natural History, was figured and described by Finsch (Die Papageien, vol. 2, 1868, p. 97, pl. 2). Its plumage throughout is clear light blue, except for a slight greenish cast in a few feathers on the breast. The lesser under wing coverts are partly blue, partly white, and there is a faint line of dull white on the carpal edge of the wing. The feathers on the throat spot are dull white basally, and the skin beneath is orange. The darker markings on the wing coverts are dull brownish slate with slight blue tips.

These friendly little birds, long called the Tovi parakeet in scientific writings, are known among aviculturists as the Tovi or beebie parakeets.

The typical race *jugularis* has a range from Guerrero and Oaxaca in southern México through Central America and northern South America to northern Colombia and northwestern Venezuela. Another form is found elsewhere in Venezuela and in eastern Colombia.

**TOUIT COSTARICENSIS (Cory): Red-fronted Parrotlet;
Churiquita Frentirrojo**

Urochroma costaricensis Cory, Field Mus. Nat. Hist., Orn. Ser., vol. 1, May 31, 1913, p. 283. (Near Limón, Costa Rica.)

A small parrot, smaller than the orange-chinned parakeet, with square-ended tail; forehead, anterior loreal area, and streak below eye red.

Description.—Length 145-155 mm. Male, anterior half of crown and anterior loreal area red, with the concealed bases of the feathers yellow; a narrow streak of red from beneath the eye back over the anterior auricular region; rest of side of head and upper surface, including the inner wing coverts (except as noted beyond) rather light green; posterior half of crown and upper hindneck slightly yellowish green; anterior lesser wing coverts, outer primary coverts, upper surface of inner webs of primaries and secondaries, and outer webs of outer secondaries black, with a faint bluish cast; rest of wing coverts bright red; outer web of outer primary, and tips of the next two, dull black; rest of outer webs of primaries like back; inner under wing coverts and axillars yellow; outer under wing coverts red; tail basally bright yellow, distally green, with the tips of all of the feathers, except the outermost, black, in decreasing extent from the center pair outward; rest of tail, including outer webs of outer pair, green; throat

and feathers at the side of the mandible dull yellow; rest of under surface yellowish green.

Female, edge of the wing, and some of the outer lesser wing coverts adjacent to the black shoulder, red, the rest green; yellow of under wing coverts more extensive.

Immature, like the female, but with red of forecrown mixed with green.

In the original publication Cory described the bill as "yellowish at the tip, dark at the base; feet dark (blackish in dried skin)." Watson noted the following on the label of a female taken at Boquete; "Iris ash color, feet black, bill bone color."

Measurements.—Males (3 from Costa Rica) wing 119.3-122.0 (120.2), tail 43.2-47.5 (45.1), culmen from cere 16.2-17.0 (16.5), tarsus 12.0-12.5 (12.2, average of 2) mm.

Females (3 from Panamá and Costa Rica), wing 110.0-115.5 (112.3), tail 41.2-43.5 (42.1), culmen from cere 15.0-16.0 (15.4), tarsus 10.6-12.0 (11.4) mm.

Rare in western Panamá, status uncertain. Two records: Chiriquí (Boquete); Bocas del Toro (Cocoplum).

The Rothschild collection in the American Museum of Natural History has a female taken by H. J. Watson at Boquete, Chiriquí, February 17, 1905, marked as from "4000 feet." The only other specimen from Panamá is one, also in the American Museum, collected by R. R. Benson at Cocoplum, Bocas del Toro, November 5, 1927. This bird is marked female with a query. With a wing length of 110 mm. it seems certain that it is of that sex.

This bird, named by Cory from 4 specimens collected by H. C. Raven near Limón, Costa Rica, in the latter part of May 1910, is little known. Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 120) in Costa Rica, records 1 taken in October 1922, by Austin Paul Smith at Santa Cruz, 1,300 meters elevation on Volcán Turrialba. Slud saw the species on two occasions in October 1953, at Matrículas de Pavones on a ridge (900 meters) above the valley of the Río Reventazón.

In Peters' *Check-list of Birds of the World* (vol. 3, 1937, p. 209) *costaricensis* is included as a geographic race of *Touit dilectissima*. There is no question that the two are closely allied, but the difference in the forehead—red in the more northern bird, blue in *dilectissima*—appears clear cut. Also in the specimens of *costaricensis* seen the middle upper tail coverts reach nearly to the end of the tail, while in the more southern bird these feathers are definitely shorter. In view

of their present wide geographic separation it seems better to treat the two as allied species.

TOUIT DILECTISSIMA (Slater and Salvin): Blue-fronted Parrotlet; Churiquita Frentiazul

Urochroma dilectissima P. L. Slater and O. Salvin, Proc. Zool. Soc. London, 1870, (April 1871), p. 788, pl. 47. (South of Mérida, Venezuela.)

Like the preceding species, but with forehead blue.

Description.—Length 145-155 mm. Adult male, forecrown dull blue; upper part of lores, extending back to above eye, and short streak below eye red; cheeks, side of neck, back of crown, hindneck, back, inner secondaries, and inner wing coverts dark green; rump and upper tail coverts somewhat brighter green; carpal edge of wing black; outer wing coverts, including central primary coverts, and outer under wing coverts red; primaries and outer secondaries black, the primaries, except the outermost, edged with dark green; tail feathers yellow, with a broad band of black across the end, tipped and edged lightly with dark green; lower side of cheeks dull orange; under surface, including under tail coverts, light green; edge of wing and inner under wing coverts bright yellow; outer under primary coverts, and under surface of wing, except black outer margin of outer primary and tips of all, bluish green.

Female, like male, but with little or no red in outer wing coverts.

In the original description of the type, a male collected in the Mérida region of Venezuela by Anton Goering, it was noted that the iris was "bright brownish yellow." A female specimen in the British Museum from Trujillo, also taken by Goering, has a notation on the label that the iris was light brown. In dried skins the cere is blackish gray; basal half of maxilla and mandible neutral gray, the rest, including the line of the culmen, pale dull orange; tarsus and toes blackish brown; claws dull brown at the base, blackish at the tip.

Measurements.—Males (2 from Darién and Chocó), wing 107.8, 114.2; tail 40.7, 42.4; culmen from cere 15.0, 15.1; tarsus 12.8, 13.5 mm.

Females (3 from Darién, Chocó, and western Venezuela), wing 107.9-115.0 (110.9), tail 39.5-44.9 (42.3), culmen from cere 13.9-16.0 (15.1), tarsus 11.4-12.7 (12.2) mm.

Known in Panamá from the upper Tropical and Subtropical Zones on Cerro Pirre, Darién.

E. A. Goldman collected a pair at 1,600 meters elevation at the head of the Río Limón on April 20, 1912. On February 6, 1961, I saw

several at about 600 meters elevation on the Río Seteganti near the ancient site of the Cana mines but did not succeed in securing specimens. On the wing the black wing markings were prominent, and when one passed near in swift flight I noted the red on the side of the head. Three that flew in close formation swung swiftly past me several times and then disappeared. Two finally alighted in the top of a red-flowered tree but were hidden among the green leaves where we could not locate them.

Current treatment includes this bird under a trinomial name. I doubt that the bird described by Cory as *costaricensis*, from near Limón, Costa Rica, is related, other than as a member of the same genus, because of its distinct red crown and other differences. The bird of Cerro Pirre is known in the Andes of Colombia and in the Mérida region of Venezuela.

PIONOPSITTA HAEMATOTIS (Selater and Salvin): Red-eared Parrot; Casanga Montañesa

Somewhat smaller than the common casanga, *Pionus menstruus*; head slate colored, washed with olive; ear coverts red.

Description.—Length 205-230 mm. Adult male, feathers of crown and upper hindneck slate, washed more or less heavily with olive; lower hindneck yellowish olive; back, inner wing coverts, inner secondaries, rump, and upper tail coverts yellowish green; primaries dull black, the outer ones edged narrowly with light buff; outer wing coverts and outer secondaries with inner webs dull black, outer webs blue, edged with green; central tail feathers green with the tips and outer webs of outer feathers blue; basal part of inner webs light red; lores dull white; in some a narrow line of the same color back of the cere; side of head and upper neck dull slate, washed with olive; ear coverts light red, bordered with white (in some these colors hidden by darker tips); lower foreneck and upper breast olive-yellow; (in the subspecies *coccinollaris* the lower foreneck marked with red); rest of under surface light green mixed on the sides with red; edge of wing and under wing coverts blue, the latter in part edged and tipped with green; axillars red, this color spreading in varying amount to anterior under wing coverts.

Adult female, like the male, but usually somewhat duller in color.

This is a forest species widely distributed where there is suitable habitat. There are no records of it along the savanna area of the western Pacific slope, nor has it been reported from the Azuero Peninsula. Two geographic races are recognized, separated by the presence

or absence of red across the base of the foreneck. Other characters that have been suggested, including the presence or absence of white on the chin, of reddish tips on the feathers of the crown and hindneck, and in the amount of red on the under wing coverts, are variable in the series of these birds now available, and so have no validity. Both subspecies range to Panamá, one in the west and the other in the east.

On several occasions I have found small groups investigating holes in trees, in which they slept.

PIONOPSITTA HAEMATOTIS HAEMATOTIS
(Sclater and Salvin)

Pionus haematotis P. L. Sclater and O. Salvin, Proc. Zool. Soc. London, August 1860, p. 300. (Verapaz, Guatemala.)

Characters.—Lower foreneck without red.

A female, taken near Puerto Armuelles, Chiriquí, February 10, 1966, had the iris pale grayish brown; bill somewhat brownish white; cere brownish orange; tarsus and toes very pale dull brownish white; claws dull brown.

Measurements.—Males (5 from Panamá), wing 142.8-150.7 (146.9), tail 59.1-62.8 (62.6), culmen from cere 18.2-19.5 (19.1), tarsus 16.4-17.9 (17.4) mm.

Females (4 from Panamá), wing 138.0-143.8 (140.2), tail 54.8-61.9 (58.6), culmen from cere 17.0-18.1 (17.7), tarsus 17.2-18.0 (17.5) mm.

Resident. Found in the Tropical and Subtropical Zones of western Panamá, from the Costa Rican boundary in Chiriquí and Bocas del Toro east through Coclé. Absent in the western savannas of the Pacific slope; not recorded from the Azuero Peninsula. Apparently intergrades with the race *coccinickollaris* on the Caribbean slope in northern Coclé and western Colón.

In 1900, Brown collected a small series at Divalá in the lowlands of western Chiriquí, and in 1901 secured a pair at Soná, Veraguas. In February 1966, near Puerto Armuelles, Chiriquí, I saw a few at the head of the Río Corotú, adjacent to Costa Rica. I have found them in small numbers near El Volcán and Santa Clara, up to 1,350 meters, and Mönniche secured 1 at about 1,900 meters on Peña Blanca, above Boquete (Blake, Fieldiana: Zool., vol. 36, 1958, p. 512). In Bocas del Toro, collectors of the Gorgas Memorial Laboratory secured 1 near Almirante, November 25, 1960, and Kennard shot a male on March 9, 1926, at 300 meters elevation on the Boquete trail. Older records report this race near Santa Fé in the mountains of Veraguas.

In mannerisms and general appearance these birds suggest the common casanga. One taken March 3, 1952, at El Uracillo, northern Coclé, on the Río Indio, is intermediate toward the eastern race but near the present form. Above El Volcán I recorded them at 1,800 meters, and near Santa Clara I found them ranging in the shade trees above coffee. A female taken at El Uracillo was in company with a female casanga, the two preening one another, and apparently using a tree hollow in company. Near Puerto Armuelles I found them feeding on figs in high forest, in company with other parrots and toucans.

Those from western Panamá do not differ from birds of Central America, where this race ranges to southern México.

PIONOPSITTA HAEMOTOTIS COCCINICOLLARIS (Lawrence)

Pionius coccinickollaris Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1862, p. 475. (Lion Hill, Canal Zone, Panamá.)

Characters.—Feathers of lower foreneck and extreme upper breast more or less bright red, less in amount in females, often a prominent band in adult males.

A male taken March 8, 1950, on Cerro Chucantí, Panamá, had the iris honey yellow; cere wax yellow; entire bill light brownish white, washed faintly with yellow on the sides of the maxilla and mandible; tarsus and toes honey yellow; claws light neutral gray.

A female collected March 16, 1964, on the Río Tacarcuna, Darién, had a narrow inner ring in the iris of yellowish green, with an outer ring of light orange; bare skin around eye dull cream-yellow; cere dull orange; basal half of mandible pale dull honey yellow; the broad gonys somewhat paler; rest of bill dull white; tarsus and toes dull honey yellow; claws pale dull brown, darker at the tip.

Measurements.—Males (10 from Panamá), wing 137.8-152.5 (147.1), tail 61.1-68.0 (64.6), culmen from cere 18.2-21.4 (19.6), tarsus 16.8-18.7 (17.6) mm.

Females (8 from Panamá), wing 144.9-150.2 (147.9), tail 58.7-68.8 (64.8), culmen from cere 17.6-19.7 (18.6), tarsus 16.2-19.2 (17.8) mm.

Resident. Found on the Caribbean slope from the Canal Zone (Gatun; Lion Hill, formerly) east in San Blas to the Colombian boundary (Permé; Puerto Obaldía); on the Pacific side from eastern Panamá Province (Cerro Azul; Puerto Antonio on the Río Bayano; Cerro Chucantí) through Darién (to 900 meters on Cerro Sapo; Jesucito; Jaqué; 1,600 meters on Cerro Pirre; Boca de Paya; 1,450 meters on Cerro Tacarcuna; La Laguna; 575 meters on the Río Tacarcuna).

The notes of this bird are high-pitched, and differ thus from the casanga. I have found them resting quietly in forest and calling softly. At times they feed in the same trees as the larger Amazon parrots. Near Jaqué, where we found them in swampy forests, they were called *pericote*, possibly in reference to their small size, as small jungle rats are called by the same name. The inclusion of Cerro Azul in the range is from a record of several seen on the lower slopes by Eugene Eisenmann June 30, 1952.

This race continues beyond the Isthmus in northwestern Colombia.

**PIONOPSITTA PYRILIA (Bonaparte): Saffron-headed Parrot;
Perico Cabeci-amarillo**

Psittacula pyrilia Bonaparte, Comp. Rend. Acad. Sci. Paris, vol. 37, 1853, p. 807.
(Sierra Negra, above Fonseca, Guajira, Colombia.)

With the size and body color of the red-eared parrot, *Pionopsitta haematotis*, but with head orange-yellow, bend of wing red, and inner webs of central tail feathers yellow.

Description.—Length 210 to 220 mm. Adult (sexes alike), entire head and neck (except base) and upper lesser wing coverts bright orange-yellow (with many of the feathers bright red basally); lower hindneck, back, rump, tertials, inner secondaries, and upper tail coverts bright green; outer middle and greater wing coverts, and outer secondaries blue, the secondaries and inner coverts edged with green; primaries dull black; exposed webs of rectrices green, inner webs largely yellow, tips blue; lower foreneck, and upper breast dull greenish yellow; lower breast and abdomen bluish green; sides greener; flanks somewhat yellowish; under wing coverts, axillars, and edge of wing bright red; inner webs of under surface of primaries green.

Immature, crown and hindneck dull green; greenish orange of upper breast extended over sides of neck and throat; bases of auricular feathers dull red; otherwise like adult.

In museum skins the bill is horn color, and the tarsi and feet dull black. The cere, loreal area, circle around the eye, and a narrow line along the base of the mandible and chin are bare except for scattered feather filaments. The bare area is colored dull black.

Measurements.—Males (16 from northwestern Colombia), wing 136.8-148.8 (143.3), tail 61.2-71.5 (65.7), culmen from cere 16.3-18.2 (17.5), tarsus 15.2-16.7 (15.9, average of 15) mm.

Females (8 from northwestern Colombia), wing 134.8-144.6 (140.8), tail 62.2-68.8 (64.5) culmen from cere 16.3-18.1 (17.3), tarsus 15.8-17.6 (16.7) mm.

Status uncertain. Known in Panamá from 2 records from Darién in the lower Tuira area (Tapalisa; Cituro).

Inclusion of this species is based on 2 specimens, both females, in the American Museum of Natural History taken by W. B. Richardson in 1915. One was collected at Cituro, back of Boca de Cupe, on May 13. The other, from Tapalisa, according to Griscom, was taken March 17. The label on the specimen bears only the date 1915. It is known from other material that Richardson was at Tapalisa from February 16 to March 18 so that this bird must have been collected during that period.

The species is one of wide range across northern Colombia to northwestern Venezuela.

Dugand (*Caldasia*, vol. 5, no. 21, March 20, 1948, p. 183) has designated the type locality as the Sierra Negra, in the northern Sierra de Perijá. The locality "Rio Acha" (Riohacha) on the coast of northeastern Colombia, given by Bonaparte in his original description, cannot be correct since the bird does not range in that semiarid section. It is presumed, therefore, that the type specimen came from the mountain forests to the south where these parrots are common.

PIONUS MENSTRUUS RUBRIGULARIS Cabanis:
Blue-headed Parrot; Casanga

FIGURE 11

Pionus menstruus rubrigularis Cabanis, Journ. f. Orn., vol. 29, April 1881, p. 222.
(Costa Rica.)

A green parrot, with blue head and upper breast; red on under tail coverts and base of tail.

Description.—Length 225-255 mm. Adult (sexes alike), head and neck blue, with the feather tips slightly darker blue, and the basal portion green to olive; back, scapulars, secondaries, primary coverts, and primaries green; rump and upper tail coverts brighter green; wing coverts more yellowish green; outer tail feathers blue with red base, central pair green with black tip; breast, sides, and under surface of wings green; in some individuals the feathers of lower breast and abdomen tipped indistinctly with light blue; under tail coverts mixed red and yellowish green; a partly concealed red area on base of foreneck.

Immature, duller, with blue of head and breast reduced in extent, in some with the crown mainly green, and the sides of the head blackish slate; forehead with a patch of red, and scattered red feathers in the crown.

A male taken at Guánico Arriba, Los Santos, January 27, 1962, had the iris dark brown; bare space about eye dull blue; a spot of dull red on sides of maxilla at base; lower surface of mandible at base dull brownish white; rest of bill and cere dull black; tarsus and toes dull greenish gray; claws black.

A female, collected near Puerto Armuelles, Chiriquí, February 24, 1966, was similar except that the tips of the maxilla and mandible were fuscous, the rest of the bill dull brownish red, and the tarsus and toes dull olive, with the scutes outlined in white.

Measurements.—Males (20 from Panamá and northern Colombia), wing 170-178 (173.3), tail 70.2-74.5 (72.5), culmen from cere 21.3-25.7 (23.4), tarsus 19.0-21.0 (19.8) mm.

Females (18 from Panamá and northern Colombia), wing 160-178 (169.8), tail 65.0-76.0 (69.7), culmen from cere 21.1-24.8 (22.9), tarsus 19.0-20.6 (19.7) mm.

Resident. Found in the Tropical Zone of both slopes; recorded in Darién to 550-575 meters in the foothills of Cerro Pirre (Cana), and on the Río Tacarcuna at the base of Cerro Malí; Isla Coiba; Isla Canal de Afuera; Isla Cébaco; Archipiélago de las Perlas (islas San José, Pedro González, del Rey, and Cañas).

The casanga, though kept in captivity in lesser numbers, is as well known throughout Panamá as the larger parrots because of its wide distribution. Its slightly smaller size often is emphasized by the tail, in which the tip becomes worn away by friction in the nesting hole toward the close of the breeding season. When in flocks, casangas usually fly in loose formation, rather than divided in pairs. Also the flight seems more rapid, more like that of parakeets, in contrast to the steady direct progress of the larger parrots.

The nesting season comes from February to April. One female taken at Almirante February 6 was laying. In Darién, on the Río Jaqué, I saw young in the possession of Chocó women on March 29, 1947, and all through the first half of April pairs were active about their nesting holes. As one curious incident (already noted above) we found a female casanga in company with a female red-eared parrot, with the two grooming one another, and playing around a hole in a dead branch.

Outside the nesting period casangas range in flocks of from half a dozen to 30 or more, the larger groups assembling where food is abundant. They are troublesome around small cornfields, where they do considerable damage, so that there is much complaint against them. Boys and men often are stationed in the fields to drive them

away. On the Río Tuira, near Boca de Paya, I noted one interesting frightening device that was made of a thin strip of balsa wood cut to resemble a hawk in silhouette. A cross strip fastened by a peg, with half a dozen *pavón* feathers thrust in the wood simulated wings, others formed a tail. This crude bird form, two-thirds of a meter long, suspended by a cord attached to the peg that fastened the wings to the body, gyrated actively in the wind so that it gave a clever simulation of flight.

Food supplies other than the cornfields, when in abundance, as stated, attract the birds in fair-sized flocks. It seems probable that



FIGURE 11.—Blue-headed parrot, casanga, *Pionus menstruus rubrigularis*.

after the breeding season these bands may move about to some degree. In work during several months on Isla San José and Isla Pedro González nearby, we did not find casangas in the nesting period from February through April. But at the beginning of May a few pairs appeared, and by June these parrots were present in noisy flocks. They were attracted especially by the ripening fruit of the *membrillo*.

In the nesting season, when the birds are in pairs, they are mainly silent, but in later flock formation they are constantly noisy. Their chattering calls are rather high-pitched, and so differ from those of the large Amazon parrots and the macaws. The flocks sleep in company, coming to the same places each evening and leaving the following morning at sunrise. Eggs, according to Schönwetter (Handb. Ool., pt. 9, 1964, p. 520) measure $32.0-36.2 \times 24.7-27.4$ mm.

The blue-headed parrot has a broad range from southeastern

Costa Rica through Panamá and northern South America, south to eastern Perú, Bolivia, and north-central Brazil. Those of Central America differ slightly in depth of blue on head and breast, in darker green of the back, in amount of red on the lower foreneck, and in average smaller size, from the population of southern Colombia southward. The differences noted are variable but are evident when specimens from Panamá and Brazil are compared. The northern race covers northern Colombia, while in central and southern Colombia there is a broad area of intergradation in which size usually is large like the southern race, but color in the main is like that of the northern group. Wing measurements in typical *menstruus* range from 178 to 187 mm.

**PIONUS SENILIS (Spix): White-crowned Parrot;
Casanga Cabeciblanca**

Psittacus senilis Spix, Av. Spec. Nov. Bras., vol. 1, 1824, p. 42, pl. 31, fig. 1. (Veracruz, México.)

Pionus senilis decoloratus Griscom, Amer. Mus. Nov. No. 379, October 17, 1929, p. 6. (Pozo Azul de Pirris, Costa Rica.)

Similar to the blue-headed parrot, but forehead and crown white; rest of head and breast greenish blue.

Description.—Length 230-245 mm. Adult male, forehead, feathered anterior lores, and anterior half of crown white; throat and upper foreneck buff to brownish white; rest of head, lower foreneck, upper hindneck, and upper breast greenish blue, each feather edged with dull blue; back, rump, and upper tail coverts green, with some of the feathers partly blue basally; lesser, middle, and greater coverts green basally, tipped with brownish olive, in part spotted with buff to olive-buff; greater coverts and inner secondaries green externally, blue on concealed portions; primaries and outer secondaries dark blue, with outer webs of outer primaries green at tips; upper surface of tail with central feathers green, the others blue; lower breast, abdomen, sides, and flanks rather dark green, in some edged in part with dark blue; edge of wing narrowly buff; central under wing coverts blue; outer under wing coverts, under primary coverts, and under surface of wing green; outer webs of primaries dull black; under tail coverts and base of tail red; in some, abdomen and flanks suffused with red.

Adult female, usually with green and blue colors somewhat duller.

Immature, forehead and anterior crown edged and tipped with white to buffy white; throat buffy white; general color green with

blue markings much restricted or absent, and olive tipping on wing coverts slight; wings and tail as in adult.

A male, taken near Puerto Armuelles, Chiriquí, February 9, 1966, had the iris light mouse brown; bare space around eye light dull reddish orange; culmen and adjacent side of maxilla light dull greenish gray; lower side of maxilla and mandible dull yellowish white; tarsus and toes pale orange; claws neutral gray at base and on sides, shading to dusky neutral gray on top and at tip. A female companion collected with the male was similar.

Another female taken near Palo Santo, Chiriquí, February 28, 1965, had the iris reddish brown; thickened rim of eyelid dull dark brown; space around eye dull pinkish brown; cere buffy brown; bill light greenish yellow, paler on tip of maxilla; tarsus and toes dull orange-brown; claws fuscous-black.

Measurements.—Males (10 from Costa Rica and Chiriquí), wing 168-177 (172.2), tail 66.8-75.6 (71.1), culmen from cere 23.9-25.7 (24.4), tarsus 19.0-20.2 (19.6) mm.

Females (9 from Nicaragua, Costa Rica, and Chiriquí), wing 163-174 (169.3), tail 66.6-72.2 (69.7), culmen from cere 21.0-23.6 (22.9), tail 18.8-19.7 (19.2) mm.

Resident. Rare, from the Tropical to the lower Subtropical Zone in western Chiriquí; and in the Tropical Zone in western Bocas del Toro.

On the western slope of the volcano in Chiriquí I have found these parrots in small numbers from the southern side of Cerro Pando west toward the Costa Rican boundary to Santa Clara, at elevations ranging from 1,100 to 1,800 meters. On several occasions there I saw single birds in forest areas, or in tall, dead trees in open pastures. I took specimens at Santa Clara, March 18 and 20, 1954, and have seen others collected by Dr. Frank A. Hartman from above Palo Santo on February 26, 1949, February 11, 1953, and February 29, 1956, the last mentioned being now in the U.S. National Museum. In 1965 I collected a female at this point on February 28, and noted others during March. West of Puerto Armuelles in February and March 1966, I found several pairs along the hills on the Costa Rican boundary. On Almirante Bay, at John Crow Point, I had a clear view of a flock of 5 white-crowned parrots on February 7, 1958, as they flew past with the white on the forecrown showing clearly.

Griscom (Amer. Mus. Nov., no. 293, 1928, p. 1), in an account of the collection from Bocas del Toro made by Benson, includes this species as the first record for Panamá, but gives no further data.

Dr. Eugene Eisenmann informs me that Benson secured 2 at Almirante May 5, 1927. In body form and in manner of flight this species resembles the blue-headed parrot. The call notes also are similar.

From examination of a considerable series from the entire range of the species from southern México through Central America to western Panamá it appears that there is variation from dark to light color, mainly according to age, without regard to geographical area. One from Santa Clara is the darkest seen, and some specimens from Yucatán are like those of Costa Rica. As it has not been possible to separate those examined into two geographic groups, Griscom's subspecies *decoloratus*, described from Costa Rica, is listed as a synonym of *senilis*.

AMAZONA AUTUMNALIS SALVINI (Salvadori): Red-fronted Parrot; Loro Frentirrojo

Chrysotis salvini Salvadori, Cat. Birds Brit. Mus., vol. 20, December 1891, pp. 271 (in key), 300, pl. 7, fig. 3 (Lion Hill, Canal Zone, Panamá.)

A large green parrot, with red forehead.

Description.—Length 310-350 mm. Adult (sexes alike), forehead and lores bright red; crown and hindneck green, banded with lavender; rest of upper surface green; outer secondaries bright red, tipped with blue-black to black; primaries black, all except the outermost with basal half of outer web green; central pair of rectrices green, others with broad tips of greenish yellow, the 3 outer pairs basally red; side of head and under surface, including under wing coverts, yellowish green; edge of wing and under tail coverts greenish yellow; in some individuals the feathers of the throat basally red.

Immature, red of forehead restricted.

A male taken at Puerto Armuelles, February 26, 1966, had the iris orange; rim of eyelids black; rest of bare skin around eye dull yellowish white; tip of maxilla and cutting edge of both maxilla and mandible slaty gray; bill elsewhere light brown, changing to yellowish brown in front of nostril; tarsus and toes very pale gray, with the scutes outlined in white; claws slaty black.

Measurements.—Males (10 from Panamá), wing 207-222 (213.1), tail 113-130 (120.1), culmen from cere 27.7-32.0 (30.3), tarsus 23.0-26.0 (24.5) mm.

Females (10 from Panamá), wing 195-214 (203.9), tail 109-122 (116.3), culmen from cere 27.0-30.8 (29.2), tarsus 22.8-26.0 (24.5) mm.

Resident. Common in the Tropical Zone throughout the Isthmus;

Isla Coiba; Isla Escudo de Veraguas; Archipiélago de las Perlas (islas San José, Pedro González, del Rey, Cañas, Santelmo).

The red-fronted parrot, in general, resembles the mealy parrot in size and in longer tail (compared with the yellow-head) so that at a distance the two appear identical. Near at hand the red forehead of the present species is diagnostic. This species and the mealy parrot utter strident calls in which the notes are similar, but in the red-front the sound usually is harsher.

Like the related species the red-front congregates in small bands where figs or other fruits are attractive. At such times, I have found them occasionally with macaws. Toward sunset pairs cross the sky to spend the night in a common roost that, near the sea, may be in tall mangroves. Elsewhere they gather in tall trees along rivers.

The species is one of those kept commonly as a pet. In towns usually they are confined in cages, but around Indian ranchos range more or less at freedom.

AMAZONA OCHROCEPHALA PANAMENSIS (Cabanis):
Yellow-headed Parrot; Loro Real

FIGURE 12

Chrysotis panamensis Cabanis, Journ. f. Orn., vol. 22, July 1874, p. 349. (Panamá).

A large green parrot with yellow on the crown.

Description.—Length 280-315 mm. Adult (sexes alike), general color green, darker above, more yellowish green below; forehead, lores, and anterior half of crown yellow, in some, the feathers with concealed red base; superciliary area and center of crown, (bordering the yellow area) somewhat bluish green; anterior lesser wing coverts, and outer webs in center of outer secondaries red; tips of secondaries and outer webs of inner primaries dark blue; primaries otherwise green on basal portion, black on tips; outer webs of longer secondaries edged lightly with greenish yellow; distal end of tail feathers except central pair greenish yellow; inner webs at base light red; a narrow, partly concealed band of yellow around distal end of tibia; under surface of wing dull green, except for black tip; in some, a few red or yellowish feathers on carpal margin.

Immature, less red in tail, and without yellow on tibia.

Iris yellow, or orange-yellow; upper half of maxilla, including tip, fuscous-brown to dull black; broad base of gonys dull red; base of maxilla and rest of mandible pale dull buffy white; tarsus and toes dull brownish flesh color; claws fuscous-black.

Measurements.—Males (11 from Panamá), wing 191-207 (201.1), tail 94.1-109.0 (102.3); culmen from cere 28.8-33.5 (31.6), tarsus 24.0-26.4 (25.2) mm.

Females (3 from Panamá), wing 184-202 (194.2), tail 92.0-108.6 (100.1), culmen from cere 28.5-32.9 (30.1), tarsus 23.4-26.1 (24.9) mm.

Resident. Found locally in the Tropical Zone, mainly on the Pacific slope; Isla Parida; Isla Canal de Afuera; Isla San José; Isla Pedro González.

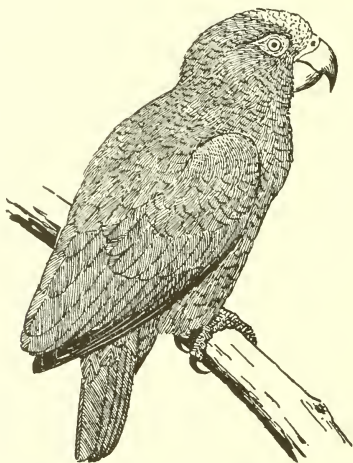


FIGURE 12.—Yellow-headed parrot, loro real, *Amazona ochrocephala panamensis*.

This, the least common of the three parrots of this genus, is absent from considerable areas of the broad range outlined above. It seems to prefer regions of gallery forest in the main, and does not penetrate most of the more humid sections.

In Chiriquí, Bangs (Auk, 1901, p. 359) listed a male taken December 3, 1900, at Divalá. I saw several on Isla Canal de Afuera on March 26, 1962, and in February of the following year found many in the high forest of Isla Parida. At sunrise one morning one flock of 20 or so left for the mainland, indication either that they crossed to the island to roost, or to the mainland to feed. The only report at present for Veraguas is of 1 taken by Arcé at Chitra (now in the

collections of the British Museum). On January 19, 1963, I found 30 to 40 feeding in an old cornfield on the Río Pocrí, below Aguadulce, Coclé. Early collectors did not record the yellow-head in the area of the present Canal Zone, though in recent years there have been a few reports of the species on Barro Colorado Island. In January 1961, several pairs came in the evening to roost in trees bordering the Río Chagres near Santa Rosa (above Juan Mina).

Yellow-headed parrots are common on the drier eastern side of the Azuero Peninsula, from the Río Santa María to Punta Mala, but not on the more humid Veraguas side. I have seen numbers feeding and using night roosts near La Jagua, Panamá. In Darién, I have noted a few coming to night roosts at El Real, and in 1959 recorded several pairs on the Río Chucunaque, near the mouth of the Río Tuquesa.

On the Caribbean slope my only records for Bocas del Toro are of a pair seen February 6, 1958, near the mouth of the Río Banana and another pair February 23 on Cayo Coco. In February 1961, they were common on the Río Boqueron, above Madden Lake, but I did not find them the following month on the Río Pequení. The only mainland area on this slope in which I have noted them as common has been near Armila and Puerto Obaldía, in the eastern San Blas, where they were the most abundant parrot. In the Perlas group they were fairly common in 1944 on Isla San José, and in lesser number on Isla Pedro González.

Though found in the same feeding areas as the other large parrots they do not appear to mix with them except in casual fashion. When perched, and when the light is right when they are in flight, the yellow forecrown is a mark for ready identification. And on the wing the shorter tail, compared to the other two, may be noticed. Though smaller in body the yellow-head is louder in voice, so that though in fewer numbers its raucous notes may contribute largely to the morning and evening chorus near parrot roosts.

The species is common in captivity, prized for its ability as a mimic of human speech and other sounds.

The range of the subspecies *A. o. panamensis* beyond Panamá is accepted currently as extending across northern Colombia. However, the series that I have examined from that area in the present studies bears out the findings of Ridgway (U.S. Nat. Mus. Bull. 50, pt. 7, 1916, p. 251) that birds from Colombia are of slightly larger size, with the wing in 6 males 202 to 207 (average 204.8) mm., and in 5 females 193-202 (average 198.2) mm.

AMAZONA FARINOSA (Boddaert): Mealy Parrot; Loro Verde.

Psittacus farinosus Boddaert, Table Planch. Enlum., 1783, p. 52. (Cayenne.)

A large parrot, entirely green.

Description.—Length 350-400 mm. Adult and immature (sexes alike), above green, somewhat paler on the rump; feathers of posterior half of crown and upper hindneck tipped more or less broadly with somewhat dull violet to violet-blue; inner primaries and outer secondaries with center of outer web red, forming an elongated patch; tips dark blue; outer primaries broadly black toward tips; carpal edge of wing yellowish green to red (according to the subspecies); under surface of wing green, with black tip; tail tipped broadly with greenish yellow; under tail coverts greenish yellow.

This is the largest of the three species of Amazon parrots found in Panamá. They are also the most common, being found where there is forest cover throughout the Tropical Zone, ranging in mountain areas to the lower edge of the Subtropical Zone. Like the other species they are observed mainly in flight, most often in their movements across the sky to or from their roosts. They fly in pairs in normal parrot custom, and call, but less stridently than the red-fronted species. During the day they may be encountered feeding in small bands, when it is common for them to range in the high tree crown, where they are detected with difficulty among the green leaves.

This parrot is common in captivity, in cages in towns, or more or less at freedom in country places, and about the ranchos of the Indians.

As a species the mealy parrot ranges from southern México through Central America to northern Brazil. Two geographic races are found in Panamá.

AMAZONA FARINOSA VIRENTICEPS (Salvadori)

Chrysotis virenticeps Salvadori, Cat. Birds Brit. Mus., vol. 20, December 1891, pp. 269 (in key), 280. (♂, Bugaba, Chiriquí; ♀, Angostura, Costa Rica.)

Characters.—Somewhat more yellowish green, especially on the lower surface; pileum light bluish green (occasionally light blue); hindneck lighter blue; carpal edge of wing yellow (rarely with a slight touch of red); slightly smaller in average size.

A female, collected near the head of the Río Corotú, west of Puerto Armuelles, Chiriquí, February 10, 1966, had the iris orange-yellow; margin of eyelids dull black; bare skin on side of head dull

grayish white; base of maxilla below nostril pale dull neutral gray; cere slaty black; rest of maxilla dull grayish brown; broad line of culmen dull buffy brown; side of maxilla and mandible dull neutral gray; top of tarsus and toes dull brownish neutral gray; under side of tarsus dull yellowish gray; claws fuscous, grayer at base.

Measurements.—Males (9 from Nicaragua, Costa Rica, and Chiriquí), wing 220-241 (229.5), tail 114-133 (122.9), culmen from cere 33.8-37.7 (35.7), tarsus 26.0-30.6 (28.4) mm.

Females (8 from Nicaragua, Costa Rica, and Bocas del Toro), wing 221-237 (225.4), tail 114.0-129.5 (123.7), culmen from cere 32.2-37.4 (34.6), tarsus 26.9-29.8 (28.1) mm.

Resident. Found in the lowland forests of western Chiriquí (Puerto Armuelles, Bugaba, Divalá) and of western Bocas del Toro (Almirante).

In forest west of Puerto Armuelles, when figs were ripening I found these parrots several times during February 1966. I have assumed also that this was the form I saw in March 1960, near the Canta Gallo bridge on the Río Escárrea below Alanje. There are no present records for this race east of this locality on the Pacific slope.

In Bocas del Toro mealy parrots range in the forests near Almirante, where they were taken first by H. von Wedel. In 1958 I found them common locally in the swampy lowland at Pondsock Point where I secured specimens. Others were seen along the Quebrada Nigua.

Schönwetter (Handb. Ool., pt. 9, 1964, p. 522) records size in 3 eggs as 37.4-38.0×28.4-29.4 mm.

This form is mainly one of the Caribbean slope in Nicaragua and Costa Rica, that has its eastern limit in extreme western Panamá.

AMAZONA FARINOSA INORNATA (Salvadori)

Chrysotis inornata Salvadori, Cat. Birds Brit. Mus., vol. 20, December 1891, pp. 269 (in key), 281. (Veraguas, Panamá.)

Characters.—Darker green, especially on the forehead and lower surface; hindneck darker blue; carpal edge of wing partly or entirely red; slightly larger in average size.

An adult female, taken March 13, 1964, on the Río Tacarcuna, Darién, had the iris orange-red; cere dull black; thickened edge of eyelids dull brownish black; bare area around eye creamy white; spot in center of side of maxilla near base honey yellow; rest of maxilla and entire cutting edge of mandible dull neutral gray; rest of man-

dible dull pale buffy gray; tarsus and toes dull honey yellow; claws black.

In immature birds the iris is brown.

Measurements.—Males (10 from Panamá), wing 226-248 (235), tail 123-143 (131.7), culmen from cere 35.0-39.5 (36.3), tarsus 28.4-30.3 (29.3) mm.

Females (8 from Panamá), wing 225-243 (233.8), tail 124-142 (132.7), culmen from cere 34.2-39.0 (36.4), tarsus 26.1-29.9 (28.6) mm.

Resident. Lowland forests of the Pacific and Caribbean slopes from Veraguas eastward to the Colombian boundary, in Darién ranging in the mountains to La Laguna and Cerro Malí; Isla Coiba; Isla Coibita; Isla Canal de Afuera.

A female taken near the mouth of the Río Paya has a number of yellow feathers scattered irregularly over the forecrown, an abnormal marking.

Those seen near Soná, Veraguas, in early June 1953, were believed to be this subspecies, which is not common on the Pacific slope west of the Río Bayano. On the Atlantic side, they are more abundant from the northern Canal Zone (Juan Mina, Barro Colorado Island) east to the eastern San Blas (Armila, Puerto Obaldía). Barbour (Bull. Mus. Comp. Zool., vol. 65, 1922, p. 197) described large numbers roosting in April 1922, on the Río Jesucito, near the base of the Serranía del Sapo in Darién. Festa (Nel Darien e Ecuador, 1909, p. 27) recorded that, in July 1895, great flocks gathered toward sunset at Punta Sabana, near the mouth of the Río Tuira. They are hunted extensively by Indians for food, and the nests are sought everywhere for the young to be reared as pets, activities that must have been responsible for their reduced abundance today.

Near Juan Mina I have found bands roosting at night in high trees bordering the Río Chagres. Below Chepo, near Chimán, and at Jaqué they flew in at evening to sleep in tall mangroves. Specimens in the Gorgas Memorial Laboratory were taken in the mountains of Darién in 1963 at La Laguna on May 29, and on Cerro Malí on May 29 and June 7.

On Isla Coiba this was the conspicuous member of the family, ranging in pairs and flocks through the heavy forest. When figs or other trees in fruit attracted them in numbers their noisy calls were so constant that few other birds could be heard. When they left their roosts in early morning they were active in moving about until they had selected a feeding ground, after which they were seen less

often in long distance flights until near sundown. Guards responsible for the ripening corn often placed men around the open fields in early morning to move the birds along to the forest by shouting or other noise, as, if not disturbed, they did much damage. The four taken here agree in color with this eastern race.

While the common country name is *loro*, or *loro grande*, near Chepo they were called *cancan*. The Chocó name is *Ka re*.

Order CUCULIFORMES

Family CUCULIDAE; Cuckoos, Anis, and Allies; Cuculillos,
Garrapateros, y Especies Afines

The varied members of this family range through the tropical and temperate regions of the world, with 11 of the 130 species found in the Isthmus of Panamá. Two are migrants from North America; two, the pheasant-cuckoo and the ground-cuckoo, are little known; and of the others only the anis, the striped cuckoo, and the larger species of squirrel-cuckoo are widely spread and common. The striped cuckoo, often called *pájaro brujo*, and the pheasant-cuckoo are parasitic, placing their eggs in the nests of smaller birds that hatch them and rear the young. The others build nests in normal fashion, though the anis are peculiar in that several females may join in placing their eggs in one communal structure, where all share in the duties of incubation and care of the nestlings.

The diversity found in the living kinds indicates an ancient lineage in geologic time, with close relationship to none of the other American families of birds. The greatest variety in the group of cuckoos, with the largest assemblage of species, is found in southeastern Asia and the East Indian islands.

KEY TO SPECIES OF CUCULIDAE

1. Plumage wholly black, (more or less iridescent)..... 2
 Plumage varied in color..... 4
2. Ridge of compressed bill elevated for basal two-thirds only; size large, wing
 175 mm. or more, tail 235 mm. or more.
 Greater ani, *Crotophaga major*, p. 121
 Ridge of compressed bill continuous for full length of maxilla; smaller, wing
 less than 160 mm., tail less than 190 mm..... 3
3. Side of maxilla smooth, or with faint, irregular wrinkles only.
 Smooth-billed ani, *Crotophaga ani*, p. 124
 Side of maxilla with strong and distinct grooves and ridges.
 Groove-billed ani, *Crotophaga sulcirostris sulcirostris*, p. 129
4. Decidedly larger and more robust; bill strong, culmen more than 40 mm.;
 tarsus long and strong, more than 65 mm.
 Rufous-vented ground cuckoo, *Neomorphus geoffroyi salvini*, p. 140
 Smaller and more slender; bill slender, culmen less than 35 mm.; tarsus much
 shorter, less than 40 mm..... 5
5. Upper surface heavily streaked with black.
 Striped cuckoo, *Tapera naevia excellens*, p. 132
 Upper surface without black streaks..... 6
6. Gray or dull brownish gray above, lower surface plain..... 7
 Reddish brown or dull black above; lower surface variegated in color.... 9

7. A dull black stripe behind the eye.
 Mangrove cuckoo, *Coccyzus minor palloris*, p. 113
 Side of head uniform, without black stripe..... 8
8. Tail tipped broadly with white; primaries edged with rufous along centers of outer webs; mandible prominently yellow except for black tip.
 Yellow-billed cuckoo, *Coccyzus americanus*, p. 111
 Tail tipped very narrowly with white; wing plain without rufous band; mandible wholly black, or with a faint yellow mark on under side near the base.
 Black-billed cuckoo, *Coccyzus erythrophthalmus*, p. 109
9. Foreneck and upper breast streaked and spotted with black; rest of lower surface white; upper surface mainly dull black.
 Pheasant cuckoo, *Dromococcyx phasianellus rufigularis*, p. 136
 Foreneck and upper breast plain brown, without markings, breast gray, under tail coverts dull black..... 10
10. Size larger, tail more than 235 mm.
 Squirrel cuckoo, *Piaya cayana thermophila*, p. 116
 Much smaller, tail less than 160 mm.
 Dwarf squirrel cuckoo, *Piaya minuta panamensis*, p. 120

**COCYZUS ERYTHROPTALMUS (Wilson): Black-billed
 Cuckoo, Cuculillo Piquinegro**

FIGURE 13

Cuculus erythrophthalma Wilson, Amer. Orn., vol. 4, 1811, p. 16, pl. 28, fig. 2.
 (Near Philadelphia, Pennsylvania.)

Lower mandible mainly or wholly black; tail tipped narrowly with white; bare skin around eye red in adult.

Description.—Length 270-290 mm. Adult (sexes alike), above hair brown, glossed faintly with bronze; a faint edging of rufous on primary coverts and inner secondaries; loreal area light gray; lower surface white, washed faintly with pale buff or pale grayish buff on foreneck, upper breast, and under tail coverts; tail tipped narrowly with white, with a faint dusky subterminal bar; under wing coverts pale buff; lower surface of inner webs of primaries pale cinnamon-buff.

Immature, somewhat browner above; more buffy below.

Bill wholly black, or with center of mandible buff to buffy white.

Measurements.—Males (10 from eastern United States), wing 132.5-143.0 (137.8), tail 142.0-155.0 (149.3), culmen 22.5-26.0 (23.7), tarsus 21.0-25.0 (23.5) mm.

Females (10 from eastern United States), wing 137.0-146.5 (141.4), tail 146.5-164.5 (154.7), culmen 21.5-25.0 (23.4), tarsus 21.5-25.5 (23.8) mm.

Migrant from the north. Rare; found casually.

This cuckoo nests in North America east of the Rocky Mountains from southern Canada south to southeastern Wyoming, eastern Kansas and eastern South Carolina. It moves in fall to a winter home in northwestern South America from Colombia to Ecuador and Perú, casually east to Venezuela. Little is known in detail of its route of travel, which includes passage through both Central America and the West Indies.

Mönniche secured a male at Lérída in the mountains above Bo-

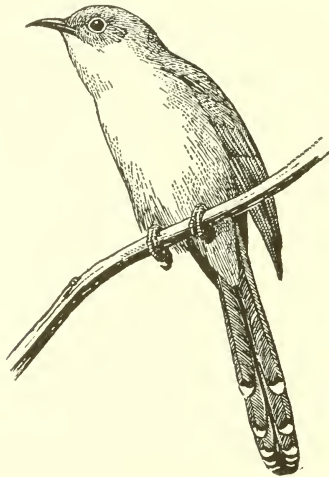


FIGURE 13.—Black-billed cuckoo, cuclillo piquinegro, *Coccyzus erythrophthalmus*.

quete, Chiriquí, on October 16, 1938. T. A. Imhof has given me a sight record of 1 near Chorrera, Panamá, on October 12, 1942. McLeannan forwarded 1 to Lawrence, taken when he was stationed at Lion Hill in the present Canal Zone. Two others have come to the U.S. National Museum from the Pacific side of the Canal Zone, a female shot September 27, 1953, on Road K-6, below Arraiján on the International Highway, and a male from near the Empire Range secured October 3, 1955. Horace Loftin recorded 1 near the Forest Preserve October 3, 1963. In our work in connection with the Chemical Warfare Service on Isla San José in the Pearl Islands we secured a female April 28, 1944. Another report is of a male col-

lected at Perm , San Blas, October 16, 1929, by H. von Wedel. Horace Loftin recorded 2 near Almirante, Bocas del Toro, October 10, 1963. A specimen in the Gorgas Memorial Laboratory was taken there on October 3, 1964.

It is probable that the species passes more regularly through the Isthmus than the few reports indicate. It ranges in the cover of leaves in trees and higher stands of shrubbery, and as it moves quietly it readily escapes detection. This is particularly true during its migrations as then it is silent, while on its northern nesting grounds attention is drawn to it most often by its slowly uttered calls.

COCCYZUS AMERICANUS (Linnaeus): Yellow-billed Cuckoo;
Cuclillo Piqui-amarillo

Lower mandible, except for black tip, and base of maxilla bright yellow; tail feathers tipped broadly with white; slight rufous band on side of wing.

Description.—Length 270-290 mm. Adult (sexes alike), above grayish brown, with a faint sheen of bronze on wings and tail; auricular region faintly darker; loreal area dull gray; outer webs of some of the proximal primaries dull rufous, forming an indistinct band along the center of the wing; tail much graduated; central tail feathers blackish at tip; others dull black, tipped broadly with white; outer web of outermost, in addition, white; entire under surface, including malar region, dull white; breast and lower foreneck tinged faintly with gray; abdomen in some faintly buff; under wing coverts white to buffy white; under side of wing with inner web of primaries, except the outer one, cinnamon-rufous at center.

Immature, tail with outer feathers duller black; light terminal area less clearly marked, usually reduced in extent, and grayish white.

This is another migrant from the north that crosses through the Isthmus en route to wintering grounds in South America. The birds range in thickets and forest, where they move quietly, often resting motionless for several minutes, except for the peering head. As they are plainly colored and of slender form they remain so hidden that they are seen only casually.

They pass southward mainly in September and October, and northward principally in April. Both eastern and western races are known from the Isthmus as will be indicated in the sections on these subspecies that follow. The usual criterion for separation of these two

has been an average difference in size, the western form being slightly larger. The overlap between the two, however, is so great that this does not suffice to identify many individuals during migration. The western subspecies is faintly grayer above, the eastern one browner, a distinction that holds in our considerable series. Females average slightly larger than males in both forms.

There are no records of the yellow-billed cuckoo on the Pacific side west of the Canal Zone. East of that area the lines of flight include both slopes to and from South America.

COCYZUS AMERICANUS AMERICANUS (Linnaeus)

Cuculus americanus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 111. (South Carolina.)

Characters.—Slightly deeper brown on the entire dorsal surface, including the tail; average size slightly smaller, but much overlap with the western race.

Measurements.—Males (10 from eastern United States), wing 138.5-145.1 (141.5), tail 135.1-148.0 (138.2), culmen from base 25.5-29.0 (27.0), tarsus 23.3-27.2 (25.0) mm.

Females (10 from eastern United States), wing 143.6-149.3 (146.0), tail 135.7-148.6 (141.4), culmen from base 25.3-28.8 (27.6), tarsus 24.0-28.0 (25.8) mm.

Migrant from the north. Tolerably common; recorded in fall migration September 1 to November 24, but mainly during October; found more rarely in spring, in April.

The U.S. National Museum has a male taken near Cocolí, Canal Zone, September 1, 1955, by collectors for the Malaria Control Service. Major General G. Ralph Meyer, in his notes, recorded another seen at Fort Sherman on the same date in 1940. The only other report for this month is of 1 collected at Permé, San Blas, September 30, 1929, by H. von Wedel. Most of the specimen records are for the month of October. A few have been found during November, with the latest date 1 captured November 24, 1962, near Corozal, Canal Zone, by Dr. Nathan Gale.

In northward passage I recorded 1 in 1949 near Chepo, April 17, and on April 20 encountered a small flight. Another report is of 1 seen April 30, 1951, on Barro Colorado Island by Nicholas Collias. A specimen in the collection of the Gorgas Memorial Laboratory was taken at Almirante, April 19, 1963.

COCYZUS AMERICANUS OCCIDENTALIS Ridgway

Coccyzus americanus occidentalis Ridgway, Man. North Amer. Birds, September 1887, p. 273. (Old Fort Crittenden, east base of Santa Rita Mountains, Arizona.)

Characters.—Slightly grayer brown on the entire dorsal surface, including the tail; crown especially grayer; average size slightly larger, but with much overlap with the eastern race.

Measurements.—Males (10 from western United States and northern Chihuahua), wing 141.8-150.0 (145.7), tail 135.5-148.4 (140.5), culmen from base 26.1-30.4 (28.4), tarsus 25.2-28.2 (27.1) mm.

Females (10 from western United States), wing 143.5-154.8 (150.5), tail 139.2-150.3 (144.3), culmen from base 27.0-30.4 (29.0), tarsus 26.0-28.5 (27.3) mm.

Migrant from the north. Rare; 2 records only.

On April 20, 1949, near Chepo, I shot a female of this race. As noted under *C. a. americanus* there was a migration flight of yellow-billed cuckoos on the day in question, another taken being a female of the eastern subspecies. There is another specimen, a male, in the American Museum of Natural History, collected by R. R. Benson at Cocoplum, Bocas del Toro, October 28, 1927.

The western form without question passes through Panamá to a winter home in South America. Its total population of individuals is far less than that of *C. a. americanus* so relatively few have been recorded outside the breeding range. We have 2 other specimens in recent collections from Colombia, 1 from Villa Artiaga, Antioquia, shot April 27, 1950, and 1 from Simití, Bolívar, collected March 30, 1947, both by M. A. Carriker, Jr. These appear to be the first records for that country.

COCYZUS MINOR PALLORIS Ridgway: Mangrove Cuckoo,
Cuclillo de Manglar

Coccyzus minor palloris Ridgway, Proc. Biol. Soc. Washington, vol. 28, May 27, 1915, p. 105. (Pigres, Costa Rica.)

Coccyzus minor continentalis van Rossem, Bull. Mus. Comp. Zool., vol. 77, December 1934, p. 389. (Volcán de Santa Ana, 4500 feet, Sonsonate, El Salvador.)

Generally similar to the migrant yellow-billed cuckoo, but with a prominent black band from beneath the eye over the ear region.

Description.—Length 280-310 mm. Adult (sexes alike), above, including the central tail feathers, grayish brown, usually grayer on the head, especially on the forehead; a dull black line below the eye,

extending more broadly back over the ear coverts; outer webs of outer secondaries somewhat brighter brown; outer tail feathers black tipped broadly with white; under surface, including under wing coverts, in some very pale buff, slightly darker on sides and under tail coverts, in others darker, varying to cinnamon-buff.

Immature, like the adults, but with tail feathers grayer, and the white tips less clearly marked; alula, wing coverts, and outer webs of outer secondaries edged with buff.

A female taken at Ensenado Venado, Los Santos, February 25, 1957, had the iris dark brown; edge of the eyelids honey yellow; rest of bare skin around eye dull greenish gray; maxilla dull black; tip of mandible neutral gray, rest bright yellow; tarsus and toes neutral gray, the scutes outlined in grayish white; claws fuscous-brown.

Other females examined had the iris dark reddish brown. In one the edge of the eyelid was broadly orange-yellow, shading outwardly from the eye to dull green, with the yellow mandible changing to orange on the base of the gonys.

Measurements.—Males (8 specimens from Costa Rica and Panamá), wing 128.5-143.3 (136.5), tail 148.0-162.0 (155.1), culmen from base 28.7-32.6 (30.5), tarsus 29.0-30.3 (29.7) mm.

Females (12 from Costa Rica and Panamá), wing 128.3-138.5 (133.1), tail 143.0-160.0 (150.2), culmen from base 28.0-32.1 (30.3), tarsus 28.1-30.0 (29.3) mm.

Resident. Found locally in the Tropical Zone of the Pacific slope of western Panamá. Recorded from Chiriquí (Puerto Armuelles, Alanje, Buena Vista); Veraguas (Río de Jesús); Los Santos (Pedasí, Ensenado Venado, Gúanico Arriba), Coclé (Natá, Aguadulce). Isla Brincanco; Isla Parida; Isla Bolaños; Isla Cébaco (sight record).

Mrs. Sturgis (Birds Panama Canal Zone, 1928, pp. 205-206) lists two sight records for Quarry Heights, Canal Zone, and Punta Paitilla, Panamá.

This interesting cuckoo ranges from the borders of the mangroves near the coast to thickets and stands of taller trees in inland groves. The birds move slowly, pausing long to peer about. As usually they are silent, they attract little attention. I have not heard them call in Panamá, but in another race in the Greater Antilles with which I am familiar the notes are guttural, uttered slowly, and rather sonorous, like those of the yellow-billed cuckoo of the north. Usually they are found near water, though the common name of mangrove cuckoo is a misnomer, as I have found them inland more than in the coastal swamps. Nesting may be irregular. A female taken May 22,

1953, near Río de Jesús, below Santiago, Veraguas, was in breeding condition, but another of the same sex collected March 23, 1962, on Isla Brincanco, in the Contreras islands, off the coast of western Veraguas, was molting heavily over the body. While I have seen these cuckoos most often in the lowlands, on March 1, 1960, I encountered 2 in low bushes bordering a pasture at 600 meters elevation near Buena Vista, above Concepción, Chiriquí. On Isla Parida, off the coast of Chiriquí, they ranged in gallery forest and tall *rastrojo* inland, while on Isla Bolaños nearby I saw them in open trees back of rocky beaches. The stomachs of those taken have held remains of large orthoptera.

These birds are little known to country residents, though some recognized them by the name *voy y vuelo*.

The only previous records for Panamá have been 1 taken by Kellett and Wood in Chiriquí during the cruise of the *Herald*, the specimen being in the British Museum; and 1 in our museum secured by Heyde and Lux near Natá, Coclé, January 5, 1889, marked "found in open woods."

As stated in the description, there is much variation in depth of color on the lower surface from light buff to cinnamon-buff. It has been supposed that these two phases marked separate geographic races—a pale one, represented by Ridgway's type of *C. a. palloris*, that inhabited the mangroves, and a darker one, found inland, that van Rossem described as *C. a. continentalis*. This, however, is not true. For example, 2 specimens that I shot in the pastures at 600 meters elevation at Buena Vista both are light-colored, while 2 from near the beach on Isla Parida and Isla Bolaños are deep cinnamon-buff. The subspecies must be known under the name *palloris*, with a range from México to western Panamá.

[*COCCYZUS LANSBERGI* Bonaparte

Coccyzus lansbergi Bonaparte, Consp. Av., pt. 1, 1850, p. 112. (Bogotá, Colombia.)

This species of north-central Colombia, western Venezuela, and western Ecuador has been attributed uncertainly to Panamá. Its mention dates from Shelley (Cat. Birds Brit. Mus., vol. 19, 1891, p. 303) who gives the range as from "Panama to Colombia and Venezuela." This was cited by Sharpe (Hand-l. Gen. Spec. Birds, vol. 2, 1900, p. 163) as "Panama. Colombia. Venezuela." The record has been treated as doubtful by Ridgway and other writers. In 1954, I made careful search in the British Museum collections and found nothing to

substantiate Shelley's statement. The inclusion of Panamá in the range has no basis.]

PIAYA CAYANA THERMOPHILA Sclater: Squirrel Cuckoo,
Pájaro Ardilla

FIGURE 14

Piaya thermophila P. L. Sclater, Proc. Zool. Soc. London, 1859 (February 1860), p. 368. (Jalapa, Veracruz, México.)

Piaya cayana incincta Griscom, Bull. Mus. Comp. Zoöl., vol. 72, January 1932, p. 324. (Permé, San Blas, Panamá.)

A large, slender cuckoo with long tail, and bright brown upper surface.

Description.—Length 400-460 mm. Adult (sexes alike), above chestnut to rufous-chestnut, usually paler on the head; wings tipped with grayish brown; each feather in the tail tipped with white, and with a subterminal black bar; foreneck and upper breast vinaceous-cinnamon; lower abdomen, flanks, and under tail coverts slate to slaty black, varying in depth of color; rest of lower surface gray; under wing coverts light gray; rest of under side of wing cinnamon-buff.

Immature, central tail feathers without black subterminal bar, and with white tip less in extent.

An adult male, shot March 6, 1961, near the Candelaria Hydrographic Station, Panamá, had the iris dark red; basal half of maxilla behind the middle of the nostril, gape, mandibular rami, and bare skin around eye dull green; anterior part of bill, including the maxilla in front of the nostril, and the mandible, except on the base of the rami, greenish yellow; inside of mouth black, except for the anterior third where the inner surface of both maxilla and mandible are yellowish green; tarsus dark neutral gray, with each scute margined narrowly with dull white; scutes on toes, and claws dull black.

A female taken January 24, 1962, at Guánico Arriba, Los Santos, had the iris bright red.

Measurements. — Males (10 from Panamá), wing 138.2-147.8 (142.5), tail 237-279 (257), culmen from base 30.5-34.1 (32.1), tarsus 33.7-37.5 (36.2) mm.

Females (10 from Panamá), wing 133.1-145.8 (140.0), tail 238-277 (253), culmen from base 30.5-33.5 (31.6), tarsus 34.1-37.4 (35.8) mm.

Resident. Found throughout both slopes of the mainland, commonly in the Tropical Zone, ranging up into the Subtropical Zone.

On the southern slope of the mountains of Chiriquí these birds range regularly to 1,500 meters elevation, less commonly to 2,000 meters or a little higher. In the denser, more humid forests that cover the Caribbean side, and in the rain forests of Darién, they are found less often, and only to 600 meters. It is interesting that this species has not been recorded on any of the offshore islands. If it is assumed

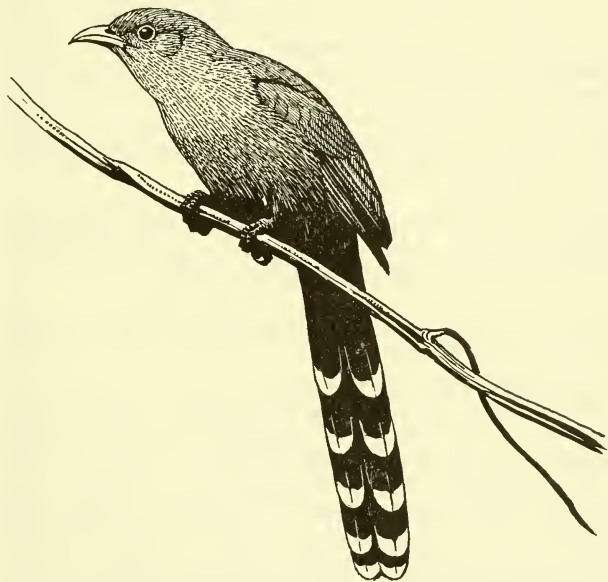


FIGURE 14.—Squirrel cuckoo, pájaro ardilla, *Piaya cayana thermophila*.

that it is a form that developed in South America, it may not have come north through the Isthmus until the rise in sea level since the close of the Pleistocene isolated Taboga, the Perlas group in the Gulf of Panamá, and the islands off the coasts of Veraguas and Chiriquí.

In the main, squirrel cuckoos are birds of more open forests, that in denser stands frequent stream borders and other edge. They are found regularly in groves and lines of trees in open fields and savannas, occasionally in mangroves and in the inland borders of swamps. When the original tree stand has been cleared second growth is favorable cover. Usually they move quietly among the outer leaves,

but on occasion run quickly along sloping branches. Flight across openings is gracefully tilting, at the end in a long glide with spread wings that terminates in an upward turn as they alight. While they move regularly through or a little below the tree crown, they descend also into the taller undergrowth, and in *rastrujo* may range in thickets. Occasionally one drops to the ground to follow some escaping prey. In stomach examination I have found caterpillars common food, often hairy or spiny, occasionally of the largest size. Some of these bear stinging hairs that produce acute and long-continuing pain at the slightest touch on human skin, as I know too well from personal experience. Yet the cuckoo seems to swallow them with impunity. Large orthoptera are regular prey, and they also eat a variety of smaller insects, as beetles, large ants, and more rarely bees. Spiders are taken also, and small lizards.

The usual note is a loud, strongly accented, explosive sound *kis kway*, varied by the addition of one or two syllables. Other utterances are clucking calls, more sonorous notes, and various others in lower tone, some sharp and abrupt, and some chattering.

On cool mornings I have seen them resting with back to the sun, wings partly expanded, and tail widely spread so that the feathers were well separated at the ends.

Skutch (Wilson Bull., 1966, p. 146) describes the nest as placed on a support of vines or closely growing branches. Two seen were near the ground in tangles of bracken; others in the top of an orange tree, and in a clump of bamboo. The foundation of the structure was a loose assembly of twigs on which green or yellowing leaves were placed to form a shallow depression for the eggs. These, in two instances, numbered 2 to a set, described as white "with a somewhat rough and chalky surface," ellipsoidal in form. The 4 eggs measured $34.1-36.5 \times 25.4-26.2$ mm. The eggs become stained with brown from the leaves on which they rest. Both male and female incubate. The young as they hatch bear a thin growth of hairlike down.

As the bird is one that attracts attention because of its size and slender form, it is well known to country people who recognize it under a number of names. One that I have heard frequently is *ciruelero*. When I asked as to the derivation of this, it was explained that the birds were often in the plum trees (*Spondias*), the *ciruelos*, that grow so abundantly as living fence posts, or at random in fields and on hillsides. In Los Santos it was called *guaquita monte*, in Herrera *cochiperco*, and in Veraguas *puerquero*. The Cuna name is *Kee tah*, which may be the base for the name *crica* heard at Jaqué,

and *trisa* at Boca de Paya, Darién. Those in Bocas del Toro who spoke English knew it as the *old-man-bird*, an obvious import from Jamaica where this is the name of another species of cuckoo of similar form.

The squirrel cuckoos of Central America form an interesting complex that, through collections assembled in recent years, now may be understood with greater certainty. *Piaya cayana mexicana* of the Pacific slope of México, from southern Sonora to Oaxaca, differs from all other subspecies by the cinnamon color of the under surface of the tail (except for the black subterminal bar and the white tip), and much paler coloration. Van Rossem, on the basis of 1 specimen, thought that the birds of southern Sonora carried this lighter color still further, named them *extima*, but this does not appear valid. This name, therefore, is placed as a synonym of *mexicana*. Another paler race, *P. c. stirtoni* van Rossem, found also on the Pacific slope from extreme southwestern Guatemala to northwestern Costa Rica, has the under surface of the tail mainly black; it is definitely darker than *mexicana* in addition, and is slightly paler than the following race.

Piaya c. thermophila Sclater has the darker tail just mentioned, and in addition is darker both above and below. After examination of approximately 100 well-documented skins this name is accepted for the entire population found on the Caribbean slope from Tamaulipas to Oaxaca, México, including the Yucatán Peninsula, and on both slopes from Chiapas through Central America to extreme northwestern Colombia, except for the limited area on the Pacific side assigned to *stirtoni*. Variation is evident in this range, but it is individual except for a minor difference in bill size. In a series of 10 of each sex from eastern México the length of the culmen measured from the base is as follows: Males 27.6-31.2 (29.1), females 27.6-31.3 (29.3) mm. In an equal number from Panamá this measurement is as follows: Males 30.5-34.1 (32.1), females 30.5-33.5 (31.6) mm. Relatively few birds have been examined from Guatemala, but from Honduras to Costa Rica birds with bill sizes in both ranges are found. The distinction seems too slight and too variable to warrant any separation by name.

Throughout Panamá there is variation in depth of dorsal color. While most of those from the eastern side of the Azuero Peninsula are paler, and those from Bocas del Toro and Darién darker, styles are mixed, as dark birds are found in the Azuero area, and paler examples mixed with the dark series elsewhere. Griscom proposed the

name *incincta* for the paler birds, but the differences are not sufficiently stable to warrant this distinction. In fact, the color difference that he notes in the tail of his type specimen in his paragraph on characters, indicates merely that his bird was an immature individual.

PIAYA MINUTA PANAMENSIS Todd: Dwarf Squirrel Cuckoo,
Pájaro Ardilla Enano

Piaya rutila panamensis Todd, Ann. Carnegie Mus., vol. 8, May 20, 1912, p. 212.
(Loma del Leon = Lion Hill, Canal Zone, Panamá.)

A small, reddish brown cuckoo with graduated, white-tipped tail; a miniature of the large squirrel cuckoo.

Description.—Length 255-270 mm. Head with a bushy crest. Adult (sexes alike), crown cinnamon-brown; rest of body rufous-brown, with tips of wings blackish brown; tail chestnut, with a dull black subterminal bar and narrow white tip; throat and upper breast cinnamon-brown; lower breast, abdomen and sides light brownish slate, changing to dull black on the under tail coverts; under side of tail blacker than dorsal surface, especially toward the tips of the feathers; under wing coverts brownish buff; under surface of flight features cinnamon, with the tips brownish slate.

Immature, darker on the lower breast and abdomen; tail feathers with an indistinct, very narrow, reddish brown tip.

An adult male taken at El Real, Darién, January 8, 1964, had the iris carmine-red; ring formed by the thickened edge of the eyelids red; bill greenish yellow, the green deeper toward the base; tarsus and toes dark neutral gray; claws black; inside of mouth and top of tongue deep black; underside of tongue bluish neutral gray. Another male taken March 22, 1961, at La Jagua, Panamá had the bare skin below the eye greenish yellow. Otherwise it resembled the one from El Real.

Measurements.—Males (8 from Panamá), wing 100.0-106.6 (102.4), tail 134.5-155.5 (145.3), culmen from base 19.4-22.2 (20.9), tarsus 24.7-27.0 (25.5) mm.

Females (6 from Panamá and Colombia) wing 97.7-104.5 (101.6), tail 132.8-152.7 (147.6 average of 5), culmen from base 19.4-21.4 (20.3), tarsus 24.0-27.5 (25.5) mm.

Resident. Found locally in the tropical lowlands from the Canal Zone east through the Province of Panamá (Pacora, La Jagua) to eastern Darién (El Real), to 750 meters on Cerro Pirre.

These small cuckoos are miniatures of the large squirrel cuckoo in general appearance, though on close examination in the hand it is seen that the feathers of the back of head are longer. Though

usually kept depressed they may be elevated in a distinct crest. In my somewhat limited experience with them I have found them in thickets or low tree growth, usually near streams or marshy areas. In the Canal Zone they are known along the Chagres from Tabernilla to Gatun. All other records are from the Pacific side in the eastern Provinces of Panamá and Darién. They are not common, and appear to be local in range.

In the thickets and other low growth that they inhabit they move about slowly, often remaining quiet. Because of this it is certain that frequently they are overlooked. Goldman in 1912 secured 3 near Cana on Cerro Pirre, at elevations of 600 to 750 meters. Festa (Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 14, 1899, p. 8) collected one at Laguna de Pita, Darién, in August 1895. In 1964, I secured 2 in brush in a marshy area near the Río Pirre back of El Real.

In the Pacora area they were called *come-avispa*, wasp-eaters—which was borne out by finely ground remains of hymenoptera in the stomach of 1 taken there. Others that I have examined had eaten caterpillars as well as other insects. In a specimen at El Real I found 2 caterpillars an inch and a half long, that were bright yellow with light blue heads.

In a male examined at La Jagua the oil gland was very small, with the nipple bare as usual in cuckoos.

Hellebrekers (Zool. Med. Ryksm., Nat. Hist. Leiden, vol. 24, 1942, p. 251) has described two sets of 2 eggs, and 1 single, of the typical form *Piaya minuta minuta* in the Penard collection from Surinam as white, without gloss, and of spherical form. Measurements given range from $23.5-25.5 \times 18.9-20.1$ mm. This race is similar in size to the one found in Panamá.

The subspecies of the Isthmus extends into northwestern Colombia along the lower Río Atrato, as indicated by specimens in the U. S. National Museum from Unguía, Chocó, and Villa Artiaga, Antioquia. The species ranges in South America from Colombia and Venezuela to eastern Bolivia and central Brazil.

CROTOPHAGA MAJOR Gmelin: Greater Ani, Cocinera

FIGURE 15

Crotophaga major Gmelin, Syst. Nat., vol. 1, pt. 1, 1788, p. 363. (Cayenne.)

A large, slender, long-tailed, black bird, with arched bill and light eyes.

Description.—Length 420-465 mm. Bill compressed and narrowly

elevated on the basal two-thirds; side of maxilla with strong ridges. Adult (sexes alike), glossy blue-black above and below, somewhat greenish on the primaries, deeper, more violet-blue on the tail; feathers of head, breast, and back edged or tipped with greenish bronze.

Juvenile, bill compressed, but without elevated basal ridge; body and head dull black.

A male, taken February 16, 1952, near the mouth of the Río Indio, western Colón, had the iris ivory-white; bill and tarsus black; inside of mouth at tip of maxilla ivory-white; gape and rest of inside of the mouth adjacent honey yellow.



FIGURE 15.—Greater ani, cocinera, *Crotophaga major*.

In life the light eye always is conspicuous in contrast with the dark color of the head. The color of the iris differs somewhat individually, but invariably is pale in birds that have passed the immature stage. A male shot at Juan Mina, Canal Zone, January 29, 1959, when first killed had the iris light greenish yellow. In a female, taken at El Sombrero, in the llanos of Venezuela, November 17, 1937, the iris was light grayish white.

Measurements.—Males (10 from Panamá and Colombia), wing 192-199 (194.0), tail 248-267 (253.0), culmen from base 45.8-49.3 (47.4), tarsus 43.6-49.3 (45.8) mm.

Females (10 from Panamá and Colombia), wing 178-197 (187.6), tail 237-256 (244.0), culmen from base 42.0-46.4 (44.5), tarsus 41.4-46.8 (43.5) mm.

Resident. Common locally in the tropical lowlands from the Canal

Zone on the Pacific slope, and from western Colón on the Caribbean side, east to the Colombian boundary.

Large size, compared with the other anis, attracts attention at once in this species, and identification is certain when the light-colored eye is seen. The greater ani ranges in flocks like the others, but mainly in close vicinity to water. Thickets and low trees along lowland rivers where the shores are swampy, or subject to overflow, and similar areas are the usual haunt. It is common to see them during travel by canoe along lowland streams, especially where these flow through marshes. Usually the birds are in small flocks of four to a dozen, composed of pairs, except when growing young accompany their parents. The bands are found constantly in the same locality. In studies in Guyana David E. Davis (Auk, 1941, pp. 179-183) found that each party had its definite territory, but that intruding birds from elsewhere were tolerated without fighting.

Though of slender form, the greater ani is a stronger, more heavily muscled bird than its small relatives, one that flies with greater precision, even in buffeting breezes. I have seen them cross open stretches of river channel 100 meters wide by sailing with stiffly set wings in a quartering direction against a strong wind, only stroking as they approached the farther shore as a guide to a perch on which to land. At other times they stroke briefly to gain momentum, then sail, alternating in these two movements until they reach suitable shelter. Usually they seek cover when approached. At rest they swing the long tail over the body, and then let it fall, a regularly repeated action. As cold morning mists clear after daybreak they rest with spread wings in the warm sun, when the dark, iridescent blue of the plumage shows to its best advantage. In general they present a smooth outline in contrast to the often disheveled appearance of the companion species of ani frequently found near them.

Their calls, completely different also from those of their cousins, vary from low, rather harsh croaking gutturals to the curious bubbling sounds from which they bear the usual name of *cocinera*—cook—as these notes suggest the bubbling of boiling water, or the simmering of grease in a pan over a cooking fire. Another name, heard in the savanna country of the Chepo area is *chochó negro*—black jay—in allusion to the long-tailed form like that of the common lowland jay (*Cyanocorax affinis zeledoni*) known universally as *chochó* in imitation of its usual call.

The food of this ani includes a variety of large orthoptera, among them roaches, also caterpillars, beetles, and smaller insects, with

the addition of berries. One that I examined held several large seeds of a species of euphorbia. They eat small lizards also. Their quick movements often suggest those of an active predator on any prey small enough to be swallowed.

Nests, like those of the common ani, but larger, are built of twigs and bits of vine, with a deep cup of finer, blacker materials, lined with green leaves. Fresh leaves are added during the period of incubation. Eggs vary from 3 to 10, supposed to be laid by 2 or more females, as nesting is believed to be communal on the part of the pairs that compose the flock. Belcher and Smooker (Ibis, 1936, pp. 11-12) describe the eggs as subspherical to broadly oval, blue in color, covered with a chalky deposit that during incubation becomes scratched and partly worn away. Size is variable, the usual range being $42.6-49.0 \times 35.0-40$ mm., with a minimum of 39.1×31.3 recorded.

The acrid odor common to cuckoos is especially strong in this species, a scent that to me is definitely disagreeable. Among country dwellers it is said that cats will not eat an ani because of it.

In 1952 I found a few along the lower Río Indio, west of Salud near the coast of the western sector of the Province of Colón, which is the most western record for them at present. While they are widely distributed in the lowlands the only point at which I have found them abundant is in the marshy lands back of El Real in Darién. Beyond Panamá they range in suitable country through South America (including Trinidad) to northern Argentina. Though a species of tropical lowlands, in Colombia they are reported from the open savannas of the Bogotá area at 2,600 meters elevation.

CROTOPHAGA ANI Linnaeus: Smooth-billed Ani,
Garrapatero Común

FIGURE 16

Crotophaga Ani Linnaeus, Syst. Nat. ed. 10, vol. 1, 1758, p. 105. (Jamaica.)

Of slender form, long tail, and black color, with compressed, strongly arched bill.

Description.—Length 310-350 mm. The elevated, smooth-sided ridge of the upper mandible, thin as the blade of a knife, rises in a rounded arch from the tip of the bill to end on the forehead. Adult (sexes alike), dull brownish black throughout, with a slight bluish sheen; feathers of head, and of the sides and back of the neck margined with dull bronze; back and wing coverts tipped indistinctly with dull greenish blue.

Juvenile, dull sooty brown on the body; wings and tail dull brownish black.

In an adult female, taken at Puerto Obaldía, San Blas, March 15, 1963, the iris was dark brown; bill fuscous-black, paler along the elevated ridge of the culmen; tarsus, toes, and claws black.

Measurements.—Males (10 from Panamá), wing 143.8-156.0 (149.0), tail 172-185 (177.5), culmen from base 30.5-37.0 (34.3), tarsus 36.5-41.2 (38.6) mm.

Females (10 from Panamá), wing 145.9-155.4 (149.1), tail 167-185 (176.3), culmen from base 31.4-34.9 (33.0), tarsus 36.3-39.3 (37.9) mm.

Resident. Common throughout the lowlands except in Bocas del Toro and northern Veraguas. Ranges locally in cultivated areas in the mountains of Chiriquí to 1,100 meters at Santa Clara and El Sereno near the Costa Rican boundary, 1,250 meters near El Volcán, and 1,500 meters at El Salto above Boquete; found at 550 meters in open areas on Cerro Pirre. Isla Coiba; Isla Taboga, Isla Taboguilla, and Isla Uravá; Archipiélago de las Perlas (islas San José, Pedro González, del Rey, Vivienda, Cañas, Saboga).

The smooth-billed ani originally appears to have been a species of South America, but may have entered Panamá early as open savannas of the Pacific slope could have allowed their establishment in the prehistoric period. Clearings made by Indians in the forests of eastern Panamá today often harbor flocks of anis, so that it is reasonable to believe that the birds may have been present at the time of the early Spanish explorations when the Indian population was large, and their clearings correspondingly extensive. The early establishment of this ani is indicated also by its wide distribution through the islands in the Gulf of Panamá. Spread of this species through the lower Chagres Valley may have come with the clearing of forest during construction of the Panama Railroad.

As the species is known to have expanded its range considerably, it is of interest to review its known history. The first specimens of record, taken about 1860 by James McLeannan along the line of the railroad, were reported by Lawrence (Ann. Lyc. Nat. Hist. New York, 1861, p. 301). In the lower Chagres Valley the birds prospered as Jewel (Auk, 1913, p. 426) speaks of the ani during his residence there from 1910 to early 1913 as "the most abundant of resident birds." In the Pearl Islands W. W. Brown, Jr., found them on Isla del Rey in April 1900, and on Isla Saboga in 1904. Another early report is of one taken by Festa at Punta de Sabana near the mouth of

the Río Tuira in Darién in July 1895. In 1946 I saw small flocks around the farms near the mouth of the Río Jaqué. The following year the limit of their range up river was at the head of tidewater where the Río Pavarandó joins the main stream. It is of interest to note that, in January and February 1966, Frank Greenwell and T. H. Fleming found them considerably above this point at the mouth of the Río Imamadó. They were not present there when I worked in that area in March and April 1947.

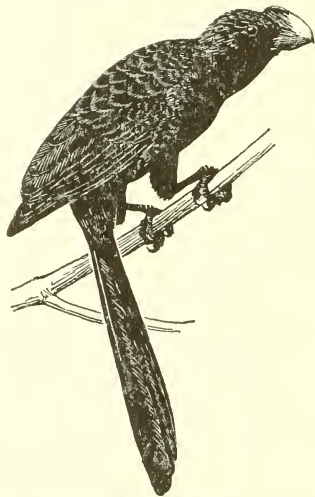


FIGURE 16.—Smooth-billed ani, garrapatero común, *Crotophaga ani*.

Extension to the west seems to have been slow. Salvin (Proc. Zool. Soc. London, 1870, p. 211) reported the ani as taken by Arcé between 1867 and 1869 at Mina de Chorchá, a short distance east of David in Chiriquí, and noted that this was the "most northern locality yet recorded" for the species on the mainland. Bangs (Auk, 1901, p. 360) reported 5 specimens collected by Brown at Divalá farther west in December 1900. Skins in the California Academy of Sciences were taken by Mrs. M. E. McClellan Davidson at Puerto Armuelles November 21, 1929, at 450 meters near Concepción, in December 1929, and at 1,280 meters near Barriles in January 1931, the latter indicating an early extension into the lower mountain area. Mönniche collected 1 at

Velo, at 1,600 meters above Boquete, on November 11, 1932. (Blake, *Fieldiana: Zool.*, vol. 36, 1958, p. 513).

I found several in March 1951, in the enclosed basin at El Valle, Coclé. In May and June 1953, they were common around Soná and Santiago, Veraguas, and were seen west along the highway to the Río Tabasará. Beyond, in subsequent years I noted anis regularly to David and Concepción, as well as in the uplands from El Volcán to Sereno on the Costa Rican boundary.

On the Caribbean side, in February and March 1952, I found this species west of the Canal Zone in the valley of the Río Indio from its mouth inland to the low foothills at El Uracillo, Coclé. This was the most western record at the time, but it is possible that they have extended since to farmlands on the lower Río Coclé del Norte. None have been reported as yet from the Caribbean slope of Veraguas, nor from Bocas del Toro.

Smooth-billed anis are interesting birds, found ordinarily in small flocks (seldom alone) that occupy definite territories (Davis, *Auk*, 1940, p. 182; *Quart. Rev. Biol.*, 1942, p. 117). These they defend against entry of others of their species, but greater anis and groove-billed anis that may intrude casually are not always molested. They search for food mainly on open ground, where they hop, run, or fly over small obstacles, often awkwardly, at times seeming to be hampered in movement by the long tail. Should the flock move along while one is left behind, presently, when the single one realizes its solitude, it begins to call loudly and flies precipitately, continuing its noise until it has found the others. In pastures anis range invariably with cattle or horses, running actively about the heads of the grazing beasts for the insects that are flushed, with the animals paying no attention to them. At such times the birds often appear alert and active. When approached they rise to perches on bushes, trees, or wires, where they alight awkwardly with oscillating tails. If disturbed further they fly off, singly or three or four together, uttering their complaining calls.

Occasionally in early morning I have seen them on the ground in open roadways, at times in company with doves. When the air is damp and cool they spend much time in sunning on open perches, resting with opened wings and fluffed feathers. For this purpose they may descend to bare, open ground where often they lie prone in a close group, with the individuals touching. It is common for them to rest together on wires or branches side by side, perhaps facing in opposite directions. At such times they preen the heads and necks of companions, occasionally with birds on either side working on one in the

center. They sleep in thick-leaved trees, usually fairly low down. Along lowland streams, as on the Chagres at Juan Mina, flocks may spend the night in the grassy marsh vegetation, where this stands a meter above the water level.

The usual call is prolonged, whining, and querulous, given with a rising inflection, often uttered on the wing, when flushed by close approach. They also have rattling and clucking notes, one somewhat like that of the groove-billed ani, and others louder. The voices of the two species are sufficiently different to be distinctive, with the smooth-billed species the most garrulous and noisy.

The nest, built rarely by a pair, more commonly is constructed by several birds, and occupied as a communal structure. Placed in the fork of a tree, it is made of small sticks broken off by the birds from nearby branches. On this base the cup of the nest proper is made of finer materials, with a lining of green leaves. The basic color of the egg shell is rather dark grayish blue, but this is overlaid by a chalk-colored deposit that usually completely conceals the brighter hue. Hellebrekers (Zool. Med. Ryksm. Nat. Hist. Leiden, vol. 25, 1945, pp. 95-96) gives an analysis of this chalky outer layer as "chiefly calcium carbonate, . . . traces of magnesium and silicium dioxide . . . organic matter in which the test for uric acid proved negative. Quantitatively the layer consists of 19% organic matter and 81% calcium carbonate." Rarely eggs lack this final, outer deposit. As stated, the nest usually is communal, with the several females in the flock depositing eggs in it. Incubation is shared, as is the care of the nestlings. Fresh twigs and green leaves are added during incubation. In deeper nests eggs in the lower part, where numerous, may become covered and are not warmed, so that they do not develop to the point of hatching. In studies in Cuba, Davis (Auk, 1940, p. 199) found 4 or 5 eggs in nests used by 1 female only, and as many as 29 where several were concerned. Nests containing many more have been reported. The eggs vary from oval to elliptical oval in form. Measurements are variable with a range of $29.2-40.4 \times 23.3-28$ mm. and an average in 63 eggs of 35×26 mm. (Bent, U. S. Nat. Mus. Bull. 176, 1940, p. 21).

The food is largely orthoptera, but includes any other insects that may be available, and spiders. I have found remains of small lizards in their stomachs, and they take berries of various kinds also. In late afternoon they often come to streams to drink, frequently flying out to rest on mats of floating vegetation for this purpose. Occasionally I have seen them jumping up to seize ticks hanging on the legs of the grazing cattle that they follow constantly, a custom that has given them

the usual common name of *garrapatero*—translated freely as one who removes ticks. They are also called *talingo* and *tío Luis*, both names given in imitation of their calls.

Dampier (Voy. New Holland, etc. vol. 3, 1703, p. 73) remarks that "they are not good food, but their bills are reckoned a good antidote against poison." He remarked also on their use as primitive "love-potions."

CROTOPHAGA SULCIROSTRIS SULCIROSTRIS Swainson:
Groove-billed Ani, Garrapatero Sabanero

FIGURE 17

Crotophaga sulcirostris Swainson, Phil. Mag., new ser., vol. 1, no. 6, June 1827, p. 440. (Temascaltepec, México.)

Slightly smaller than the smooth-billed ani, with the sides of the bill distinctly grooved.

Description.—Length 300-320 mm. Bill compressed as in the smooth-billed ani, with several deeply impressed, curved, longitudinal grooves in both mandibles. Adult (sexes alike), dull black, with a faint violet gloss on wings and central tail feathers; head and neck feathers edged with dull bronze; back, wing coverts, and breast feathers tipped with dull bronze-green to form indistinct lunulate markings; underside of wings and tail with a faint bluish or greenish gloss.

Young, brownish black, with a bluish or greenish gloss on wing and tail feathers.

Male and female taken January 21, 1962 at Guánico Arriba, Los Santos, had the iris dark neutral gray; bare loreal area dull black; bill dusky neutral gray, blackish at tip, changing to neutral gray on the base of the gonys; tarsus, toes, and claws black.

The skin in adult birds, beneath the feathers is dull black.

Measurements.—Males (10 from Panamá), wing 128.0-141.4 (134.3), tail 164-186 (173.4), culmen from base 27.5-29.7 (28.2), tarsus 30.6-35.8 (33.8) mm.

Females (10 from Panamá), wing 128.2-132.7 (129.7), tail 158-174 (167.4), culmen from base 26.2-30.6 (27.6), tarsus 31.0-35.5 (33.6) mm.

Resident. Locally common in the tropical lowlands. Recorded on the Pacific slope from western Chiriquí to the mouth of the Río Bayano in the eastern sector of the Province of Panamá, including the eastern side of the Azuero Peninsula; on the Caribbean side from the

Río Sixaola to the shores of Bahía Almirante, Bocas del Toro; the middle Chagres Valley (Juan Mina). Isla Cébaco; Isla Gobernadora.

The groove-billed ani, like the related species, ranges in areas of open fields and pasturelands, where woodland is scant or open. It does not penetrate heavily forested areas until there are clearings. Its history in the Isthmus is obscure. Since it was first reported from southern Veraguas, and the area of the Canal Zone, and is not yet known (as of 1964) from Darién or the San Blas, it is possible that it entered Panamá from Central America, where it was recorded in Costa Rica in the travels of the earliest naturalists more than a hundred years ago.

The first record for Panamá is of 2 forwarded by McLeannan, taken near the railroad, apparently in late 1862 or early 1863, as they are listed in a paper read by George N. Lawrence before the Lyceum of

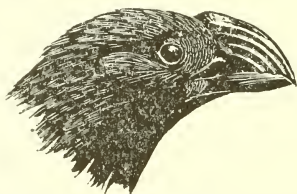


FIGURE 17.—Groove-billed ani, garrapatero sabanero, *Crotophaga sulcirostris sulcirostris*.

Natural History in New York on April 27, 1863, and published in the Annals of the Society under date of May. Soon after, the species was reported from Veraguas by Salvin (Proc. Zool. Soc. London, 1870, p. 211) from specimens taken by Arcé at Calovévora and Castillo. Goldman shot 1 in the savanna country between Chepo and the Río Pacora on March 20, 1911. The next record of note is that of a female taken by Kennard near Almirante, Bocas del Toro, February 12, 1926, and of several from Changuinola and Almirante collected by H. von Wedel in 1926 and 1927. On the Pacific side Chapman noted it near Pacora in January 1929. The first record for Chiriquí was a female collected near San Félix, December 3, 1931, by Mrs. M. E. McLellan Davidson. Aldrich found them common at the head of Golfo de Montijo, Veraguas, in February 1932.

In my own studies groove-billed anis were common in February and March 1948, through Herrera and Los Santos to Punta Mala, and in 1949 I recorded them through the eastern Province of Panamá

to the lower Río Bayano beyond Chepo. In February 1956, they were common at San Félix and Las Lajas in eastern Chiriquí, and from January to March 1958, in Bocas del Toro, from the lower Río Sixaola through the area around Changuinola and Almirante, with records from Isla Colón, Isla Pastores, Roldán and Coco cays, and the fields near the mouth of Río Occidente and on Quebrada Garay. The only offshore islands on which I have seen them are Isla Gobernadora and Isla Cébaco. On Cébaco I found a small flock on March 26, 1962, in old cornfields on the western end back of the bay called Caleta Caimán. Three years later I saw them near Platanal at the other end of the island.

Elsewhere in Central America the groove-billed ani ranges in mountain areas through open country to elevations of 1,800 to 2,200 meters, but in Panamá at present it is known only in the lowlands.

Groups of these anis are territorial in that they remain in one general area, but intruders of their own kind are not molested. The smooth-billed ani, however, sometimes will not tolerate these smaller birds. In the drier regions, in which groove-billed anis are common, they range in open areas or in scattered bush. While this seems a normal habitat, they also come into sections of heavier precipitation where there is sufficient open range, usually in pastures but also in grass-grown marshes. They also frequent marshes in the savannas during the rainy season. Like the related species, they feed constantly around livestock for the insects flushed by the grazing animals. My first sight of them along the Río Chagres at Juan Mina was of a little flock that accompanied three horses grazing in a small marsh.

At casual glance the groove-bill may not be distinguished from the smooth-billed species as the two are alike in form, color, and mannerisms. The easily seen bill markings serve to separate them readily on close examination. Call notes also are quite different, the groove-bill usually being less voluble. Its calls are higher pitched, often squeaky, and of a more chattering sound.

Their food is mainly insects, with orthoptera a prominent item. Small lizards are captured, though sometimes swallowed with difficulty. Berries also are eaten.

Birds at rest constantly perch side by side touching one another, often three together. They preen the heads and necks of those beside them, and, as stated above, never appear quarrelsome. At Las Lajas, eastern Chiriquí, on February 24, 1956, I found a nest in a low thicket that stood in water in a shallow lagoon. The birds had built in a spreading fork in a thick-leaved bush a meter above the water. The

quite massive structure was made of large leaves placed in compact form, with a cup of finer materials. When discovered there were 4 eggs, and when I collected the set the following day another egg had been added. As I lifted the nest only the central cup held firm and the rest fell apart immediately. In other locations these anis make firmer structures of twigs, bits of vine, and herbaceous material, some plucked in the branches nearby, and some gathered from the ground. Green leaves form the lining, with more added during incubation.

The 5 eggs from Las Lajas had shells that were grayish blue, covered so completely with the white, chalky deposit usual in these birds that the underlying color is visible mainly in small irregular spots or lines that suggest scratches. These 5 eggs have the following measurements, illustrative of the usual variation in size: 29.1×24.1 , 29.7×23.6 , 29.8×24.2 , 30.7×23.4 , and 33.5×25.6 mm.

In a detailed account of this species Skutch (Auk, 1959, pp. 281-317), found that when the nests were built by single pairs most of the material was brought by the male, and arranged by his mate. Both sexes incubate, with this duty shared among the participating pairs where the nest is communal. Nestlings are completely bare when hatched.

Many country dwellers do not distinguish between the two smaller anis, but recognize all as *garrapateros*. Often also the name *cocinera* is applied to them when the large ani is not recognized as distinct. Near Parita, in the Azuero Peninsula the groove-bill was called *tengo tengo*. Near Soná, they were known as *gallecillo* or *gallotillo*—little rooster—and *talingo*, and near El Copé, Coclé, as *quaní*. Elsewhere they were pointed out to me as the *tordita*.

TAPERA NAEVIA EXCELLENS (Sclater):
Striped Cuckoo, Tres Pesos

FIGURE 18

Diplopterus excellens P. L. Sclater, Proc. Zool. Soc. London, 1857, (January 12, 1858), p. 229. (San Andrés Tuxtla, Veracruz, México.)

A medium-sized, crested cuckoo, with heavily streaked back, and cinnamon to cinnamon-buff upper and under tail coverts.

Description.—Length 260-290 mm.; with long, somewhat bushy crest, and elongated upper tail coverts half as long as tail. Adult (sexes alike), crown cinnamon-rufous to cinnamon, with a central black stripe on each feather; rest of upper surface cinnamon, clay color, or buffy gray, streaked broadly with black; wing coverts with irregular black central markings; the long alula dull black; primary

coverts grayish brown, tipped with buff; primaries and secondaries grayish brown, edged narrowly with grayish white; tail grayish brown, edged with cinnamon to deep buff, tipped with buff or white; a broad white supra-auricular streak; auricular region black, lined with cinnamon to cinnamon-buff; a narrow black malar streak; foreneck, sides of neck, and upper breast buff to cinnamon, (except in some the upper breast light gray); lower breast, sides, and abdomen white; crissum cinnamon-buff to cinnamon; under wing coverts and bases of flight feathers white; bases of under surface of rectrices black in center.

Immature, crown mainly sooty black, each feather with a transverse spot of buff; scapulars and wing coverts tipped with a spot of buff, with a narrow basal bar of black; side of neck, and in some individuals the entire foreneck, with narrow, indistinct bars of dull black.

A male taken at Puerto Armuelles, Chiriquí, February 6, 1966, had the iris pale orange; a spot in front and another back of the eye honey yellow; culmen broadly fuscous-brown; side of maxilla below nostril light dull brown; tarsus and toes light brownish gray; claws dusky neutral gray.

A female taken at Juan Mina, Canal Zone, January 14, 1961, had the iris buffy brown; gape yellow; line of culmen dusky neutral gray; side of base of maxilla from gape to nostril brownish buff; side of maxilla, from nostril to dark tip, light brown; cutting edge of tip of mandible dusky neutral gray; rest of mandible pale neutral gray; tarsus gray; toes similar but with a greenish cast; claws fuscous. Another female shot at El Llano, Panamá, February 3, 1962, had the iris brownish orange; edge of eyelids and space in front of the eye and behind it greenish yellow, changing to yellowish green above and below; line of culmen and extreme tip of maxilla black, this color extending down to the nostrils; side of maxilla Verona brown, shading to dull yellow at gape and on side of mandible; rest of mandible light neutral gray; tarsus light neutral gray with the edge of the scutes lined narrowly with dull buff; toes slightly darker, with buff edging only at the joints; claws dark neutral gray.

Measurements.—Males (10 from Panamá), wing 108.1-117.5 (112.4), tail 148.0-165.0 (157.7), culmen from base 21.0-23.2 (21.8), tarsus 32.3-36.1 (34.2) mm.

Females (10 from Panamá), wing 104.0-112.3 (108.2), tail 140.0-162.0 (146.2), culmen from base 20.2-22.6 (20.8), tarsus 30.5-33.0 (32.0) mm.

Resident. Common on the Pacific slope from the Costa Rican boun-

dary east to the lower Bayano Valley (Chepo, El Llano), including the slopes of the mountains to Buena Vista above Concepción, and near Boquete; also the eastern side of the Azuero Peninsula; Isla Cébaco; on the Atlantic side from the Río Indio Valley from near the mouth of the river inland to northern Coclé (El Uracillo), through the Canal Zone, and the region back of Madden Lake, along the Río Pequení and Río Boquerón to Mandinga, San Blas.

Striped cuckoos live in thickets and open woodland, and do not enter heavily forested areas. It is certain that they now inhabit extensive regions closed to them in the precolonial period, since clearing has greatly extended the type of habitat suited to their needs. The

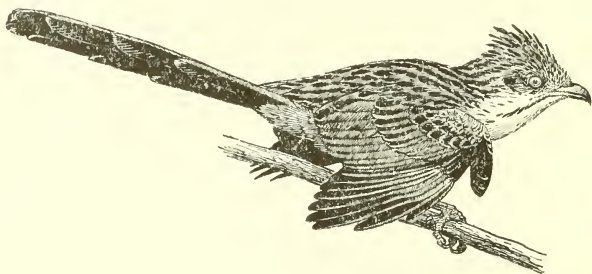


FIGURE 18.—Striped cuckoo, tres pesos, *Taphra naevia excellens*, with alula spread in display.

earliest reports of the species came in collections made by Bridges and by Hicks near David, by McLeannan along the Panama Railroad, and by Arcé at Calovévora and Chitra in Veraguas, and Mina de Chorchá in Chiriquí. W. W. Brown, Jr., in his work in western Chiriquí sent specimens to Bangs from Divalá taken in November and December 1900, and from near Boquete in early 1901. In my own studies I have recorded this interesting bird throughout the lowlands of the eastern side of the Azuero Peninsula to Punta Mala. It ranges east in the eastern sector of Panamá to the lower Río Bayano, where I observed it near El Llano in 1962, and in the Chagres Basin above Madden Lake, where I recorded it near the Peluca Hydrographic Station on the Río Boquerón in February 1961, and at Candelaria on the Río Pequení in March. Several were calling at Mandinga, San Blas, in February 1957.

Though the striped cuckoo lives in fairly open cover, and may be

heard daily, it is not easily seen. The whistled call, a high-pitched *sa-see*, uttered rather slowly is a ventriloquial sound difficult to locate. When one has flown to perch in shrubbery near me it has always sought the shelter of a screen of leaves. Here it may sit erect with tail swinging slowly from side to side for a bit, and then crouch and begin to call. Even though the bird may be within 20 meters the sound seems to come from a distance. The note has a hard metallic cadence that in its constant repetition with the bird near at hand may become disagreeable. Often they are heard calling at night even when there is no moon. While I have not made detailed studies, I am certain that each male by his calling maintains a territory of some extent since they are heard daily in the same general areas, and in my experience never with two near one another. Near Pacora on April 14, 1949, Perrygo and Ratibor Hartmann reported that male and female taken in company both were calling. The period of song begins in early January, by the end of the month is at its height, and continues at least through June. As the season advances to the period of rains the birds become bolder. In Veraguas in May and June they sometimes rested on fences and telegraph wires, where they sat with raised crests, and tail hanging straight down. At times the wings were partly opened with the alula expanded so that its black feathers were prominently displayed. After rain at night they may rest in the early morning sun on open ground.

Their food is composed of insects taken in the shrubbery, sometimes picked from the ground. Grasshoppers are a common item.

The striped cuckoo is known to be parasitic in its nesting, and in Brazil and Surinam several species of tropical ovenbirds (family Furnariidae) are recorded as foster parents. Among these, spine-tails of the genus *Synallaxis* are included. While birds of this group are locally common in Panamá, and so are available, the few reports to date have indicated the rufous-and-white wren (*Thryothorus rufalbus*) as a victim. F. W. Loetscher, Jr., (Condor, 1952, p. 169) found a young cuckoo being fed red berries by one of these wrens near Boquete, in early August 1949. The parasite was nearly grown except for the bill that was still small, and flew easily. Major General G. Ralph Meyer in his field notes recorded a young cuckoo in the nests of this wren in the Canal Zone on August 31, 1941. On the same day he frightened a young bird from another nest of the wren that he was certain was one of these cuckoos.

The eggs of the striped cuckoo are recorded as varying from pale blue to white. Hellebrekers (Zool. Med. Ryksm. Nat. Hist. Leiden,

vol. 24, 1942, p. 251), reports those in the Penard collection as "glossless, light blue, as light heron's eggs; some eggs nearly white." His measurements of 50 eggs give the following range: $18.7-23.5 \times 14.1-17.3$ mm. Bits of broken shell in the oviduct of a striped cuckoo that I shot at Buenavista, Chiriquí, March 1, 1960, were a beautiful blue. The eggs of the Furnarniids recorded as foster parents are white. It is interesting to record that the rufous-and-white wren lays a plain blue, unspotted egg. Both the wren and the ovenbirds build closed nests, with entrance through a narrow, elongated tunnel. It has been suggested that the cuckoo might make an opening in the dome of the nest in order to insert its egg. The ovenbirds are said to repair such damage quickly. Hugh C. Land, however, at a meeting of the A.O.U. in Toronto, August 24, 1967 in a motion picture showed the slender-bodied cuckoo entering the narrow nest tunnel of the spine-tail *Synalaxis erythrothorax* and later emerging without difficulty.

In connection with other possible hosts, the plain wren (*Thryothorus modestus elutus*), found in the range of the cuckoo from the Canal Zone westward, also lays an unmarked egg that is white in color.

Because of its constant calls the striped cuckoo is widely recognized. In addition to the common name *tres pesos* it is known also as *brujo*, *pájaro brujero*, and *brujillo*, terms that indicate belief that it is a witch. A less common appellation is *cuatro alas*—four wings—from the large size and prominence of the alula. According to one amusing folk tale heard in Veraguas the cuckoo is under control of a witch, and when its master whistles the bird must answer. Should it fail to reply the witch will work a charm through which the cuckoo will lose its feathers and be left naked. So to avoid the chance of this calamity the poor bird whistles all day long!

To the north this race of the striped cuckoo ranges in the tropical lowlands to southeastern México. Two other subspecies are recognized in South America where the species is found to northern Argentina and Uruguay.

DROMOCOCCYX PHASIANELLUS RUFIGULARIS

Lawrence: Pheasant Cuckoo, Pájaro Gallo

Dromococcyx rufigularis Lawrence, Proc. Acad. Nat. Sci. Philadelphia, 1867, p. 233. (Guatemala.)

A crested cuckoo with small head; dark above, with spotted foreneck and upper breast; tail large and broad.

Description.—Length 330-390 mm. Tail feathers long and broad;

upper tail coverts very long, the central ones reaching nearly to the end of the tail. Adult (sexes alike), crown sooty brown to chestnut-rufous, with the anterior feathers streaked narrowly and indistinctly with dull black; upper surface dark sooty brown, faintly glossed with bronze, the rump and upper tail coverts blacker; back, scapulars, and wing coverts tipped with grayish white; primaries with a narrow edging of buff midway of the outer web, forming an indistinct, broken band; primaries, secondaries, and upper tail coverts with a small white spot at tips; tail feathers margined narrowly with cinnamon-buff, tipped narrowly with white; an indistinct dull buffy loreal streak; a white post-ocular streak; side of head like back, but lined narrowly with cinnamon-buff and white; under surface white, with the throat narrowly streaked with dull black; these streaks broader on the foreneck, becoming elongated tear-shaped spots on foreneck and upper breast; foreneck and upper breast washed with grayish buff; under wing coverts and bases of primaries white, with a white bar across the center of the middle primaries; under surface of tail gray, blacker at tip.

Immature, sides of head, foreneck, and upper breast washed with buff, without streaks or spots; crown and crest dull grayish brown without streaks; light markings absent or reduced on wings, tail and upper tail coverts.

An adult male, taken at Chepo, April 15, 1949, had the iris dark brown; maxilla and tip of mandible very dark blackish brown; rest of mandible brownish neutral gray; bare skin around eye and lores dull bluish green; tarsus mouse brown; toes darker brown.

A female collected at Guánico Arriba, Los Santos, January 24, 1962, had the iris light brownish yellow; bare space around eyes and bare lores dull greenish gray, with the bare eyelids tinged with honey yellow; cutting edge of maxilla for basal half, and basal half of mandible dull brownish white; rest of bill fuscous-black; gape very dull brownish orange; tarsus grayish brown; toes darker.

Measurements.—Males (9 from Honduras, Panamá, and Colombia), wing 163-176 (167.8), tail 162-203 (185.4), culmen from base 26.6-28.5 (27.4), tarsus 33.0-38.6 (35.0) mm.

Females (8 from México, Honduras, Costa Rica, Panamá, and Colombia), wing 160-176 (168.0), tail 177-208 (192.6), culmen from base 26.0-28.7 (27.4), tarsus 32.9-38.0 (35.0) mm.

Resident. Reported from Chiriquí (Santa Clara, Bugaba, Boquete), Los Santos (Guánico Arriba), Canal Zone (Paraiso, Gamboa, Juan

Mina, Lion Hill), eastern Province of Panamá (Chepo), and western San Blas (Mandinga).

From the little known of this cuckoo, it is generally similar in habits to the striped cuckoo, but ranges in thickets and low, open forest without coming out into more open areas. It was reported from Panamá by George N. Lawrence from the first collection sent by James McLeannan, made on the Atlantic slope of the Isthmus. Early specimens collected by Hughes at Paraiso Station on the railroad went to Salvin. The bird was found next by W. W. Brown, Jr., on April 15, 1901, near Boquete. The label of this specimen, in the Museum of Comparative Zoology, bears the notation that it was taken at "7,000 feet" (about 2,130 meters) which may be open to question as too great an elevation. One was collected by Van Tyne on Barro Colorado Island, Canal Zone, on March 13, 1926.

In my own field studies I saw the pheasant cuckoo first near Chepo, on April 15, 1949, when we encountered a pair ranging a meter or two from the ground in tall forest with considerable undergrowth and many creepers, growing over rolling terrain. Attention was attracted to the birds by their calls, a whistle, followed by a trilling note, so ventriloquial that we could not determine whether the sound came from high in the trees or near the ground. Presently one of these cuckoos, the male, flew to a branch $1\frac{1}{2}$ meters from the ground where it rested quietly with the heavily feathered tail hanging straight down. At the discharge of the gun the female flew rather rapidly to another low perch where we soon secured it. Two days later we observed another in similar forest not far from the Río Bayano. I had opportunity on this occasion to hear the note more clearly. The first two whistled sounds had a slight suggestion of the double note of the striped cuckoo, while the trill at the end resembled the tremulous calls of the great tinamou (*Tinamus major*). This bird rested 20 meters from the ground in the top of a tall tree. On April 18, when I recorded them calling at three separate localities, we stalked them without success. We had similar lack of fortune with others until Ratibor Hartmann, my companion, whistled an imitation of the call, when the bird flew directly to him, passed overhead, and then returned to a perch where it was taken. Evidently this individual had established a territory. It was 6 years before I encountered the bird again, when on January 19, 1955, I found one calling low down in second growth forest at Juan Mina, Canal Zone. I secured another at Mandinga, San Blas, December 16, 1957—one that flew silently ahead of me through the undergrowth in forest. Armaguedón Hartmann sent me

a male from Quebrada Guisado, toward the Costa Rican boundary, beyond Santa Clara, Chiriquí, taken January 26, 1958, at an elevation of about 1,200 meters. I found the bird again on the Río Guánico, near Guánico Arriba, in southwestern Los Santos on January 24, 1962, where a female was seen as it rested quietly low in undergrowth in forest. In this same region Charles O. Handley, Jr., shot a pair in the mountain forests near the summit of Cerro Hoya at 1,200 meters elevation.

The pheasant cuckoo has a strongly muscled body, including the uropygial area, as would be expected from the large size of the rectrices, and the really extraordinary development of the elongated upper tail coverts that appear almost as a second tail. The leg muscles are weak. The nipple of the oil gland is bare.

One of the birds collected had eaten a small lizard. Others had taken large orthoptera.

This species, like the striped cuckoo, is parasitic in its nesting, though details as yet are little known. Friedmann (Centaurus, 1964, p. 288) has summarized available information, which begins with an account by M. A. Carriker, Jr., (Ann. Carnegie Mus., vol. 6, 1910, p. 568) of a juvenile found at Pozo Azul de Pirris in the Pacific lowlands of Costa Rica. This bird, fully fledged so that it was able to fly, was flushed from a nest, suspended from a tree limb, built by the broad-billed flycatcher (*Rhynchocyclus b. brevirostris*). Though Carriker could not find the parents, it did not occur to him that the young bird was a parasite, for he assumed that the cuckoos had preempted the nest.

Von Ihering (Rev. Mus. Paulista, vol. 9, 1914, p. 399) described a nest and eggs of the flycatcher *Fluvicola pica albiventer* collected by Garbe at Cidade da Barra, Bahia, in November 1913, that in addition to 4 normal whitish eggs of the parent held another, definitely larger, that measured 23.3×16 mm, and was of a pale reddish color, with many small reddish brown markings. It was suggested that possibly this was the egg of *Dromococcyx phasianellus*. The egg of this cuckoo finally became known when George K. Cherrie shot a female with a fully formed egg in the oviduct at Descalvados, Mato Grosso, December 4, 1916. This specimen, announced by Mrs. Elsie Naumburg (Bull. Amer. Mus. Nat. Hist., vol. 60, 1930, p. 168), in the American Museum of Natural History in form is long, very narrow subelliptical; in color it is faintly buff, without gloss, with scattered irregular dots of rufous to dull grayish rufous, in part in an indistinct wreath around the large end. It measures 25.2×14.3 mm. Recently

Rowley (Proc. West. Found. Vert. Zool., vol. 1, no. 3, 1966, p. 125) collected a female with an egg (broken) in the oviduct. The "base color was whitish with a series of reddish-brown dots on the larger end."

Schönwetter (Handb. Ool. pt. 9, 1964, p. 576) lists 2 additional records of interest: An early one of an egg collected in Brazil by Dra. Emilia Snethlage from the nest of a flycatcher (*Myiozetetes* sp.) that was attributed at the time to *Tapera*, and an unusual egg in a set of *Thamnophilus doliatus intermedius* from San Pedro, Honduras, in his collection that he attributed to *Dromococcyx*. These were tentative identifications, the first cited correctly by Makatch (Brutparasitismus der Vogelwelt, 1955, p. 198), the second listed incorrectly as positive by this author.

NEOMORPHUS GEOFFROYI SALVINI P. L. Slater:
Rufous-vented Ground Cuckoo, Hormiguero Montañés

FIGURE 19

Neomorphus salvini P. L. Slater, Proc. Zool. Soc. London, May 1866, p. 60, pl. 5. (Veragua = Santiago, Veraguas, Panamá.)

A long-tailed, large-billed, terrestrial cuckoo of large size, found in forests.

Description.—Length 475-520 mm. A prominent crest. Adult (sexes alike), crown cinnamon-brown, darker at center; crest feathers bluish or greenish black; hindneck, upper back, and wing coverts olive, changing to purplish posteriorly, with a bronze sheen throughout; rump and upper tail coverts purplish brown with a bronze sheen; tail dark olive-green to dull purple, also with a sheen of bronze; secondaries dark metallic green; primaries black, with a bluish or greenish sheen on outer webs; feathers on side of head, behind the eye, black margined with brown; malar region, extending below eye, cinnamon-brown; basal color of lower surface light gray, washed with brown, in some individuals heavily brown; feathers of foreneck and upper breast tipped with grayish white to produce narrow bars; a narrow, somewhat broken band of black across the breast; lower breast and abdomen in some individuals cinnamon-brown; flanks, tibia, and under tail coverts rufescent brown; under wing coverts grayish brown; under surface of flight feathers and tail black.

A male taken on Cerro Tacarcuna, Darién, February 25, 1964, had the iris dark reddish brown; bill pale greenish neutral gray, becoming neutral gray on the base of the maxilla, beneath the nostril, and on the mandibular rami; crus light blue; tarsus pale neutral gray, with

a slight bluish cast; toes bluish neutral gray; claws lined with black along top of curve, brownish neutral gray on the sides.

A female, collected on Cerro Chucantí, Panamá, March 14, 1950, had the iris dark brown; bare skin around eye neutral gray, with the bare lower eyelid light neutral gray; bill light olive-green shading to greenish neutral gray at base; tarsus and toes neutral gray.

Measurements.—Males (6 from Costa Rica, Panamá, and Colombia), wing 165.0-175.0 (169.3), tail 244.0-262.0 (254.8), culmen from base 43.6-49.5 (46.4), tarsus 69.2-72.4 (71.6) mm.

Females (11 from Nicaragua, Costa Rica, Panamá, and Colombia), wing 160.0-169.0 (163.6), tail 237.0-266.0 (250.0), culmen from base 45.7-51.1 (47.9), tarsus 69.5-73.1 (71.5) mm.

Resident. Rare, found locally in Tropical and lower Subtropical Zone forests. Reported from Chiriquí (Cordillera de Tolé), Veraguas (Santiago), Canal Zone (Barro Colorado, Gatun), western Colón (Chilar); eastern Panamá (Cerro Chucantí, Charco del Toro), Darién (Cana, Río Tuquesa, Cerro Malí, Cerro Tacarcuna), and San Blas (Permé, Armila, Puerto Obaldía).

In the original description Sclater listed his type as from "Veragua," with the statement that "besides Mr. Salvin's specimens, there is an example of this species in the British Museum, stated to be from New Granada." In the same number of the *Proceedings of the Zoological Society of London* (1866, p. 67), Salvin writes "During the past year two collections of birds were forwarded to Mr. Godman and myself by Enrique Arcé from Veragua. One was made near Santiago de Veraguas, and the other from a small village called Santa Fé." The following year (*loc. cit.*, 1867, p. 129), Salvin reported on these two, and a third from Cordillera de Tolé which is in eastern Chiriquí. Salvin and Godman (*Biol. Centr.-Amer.*, Aves, vol. 2, 1896, p. 533) state definitely that Santiago is the locality for the specimen of Sclater's description. This is, therefore, the type locality. Warren (*Type Spec. Birds, Brit. Mus.*, vol. 1, 1966, p. 259) overlooked this when she listed the type as from Cordillera de Tolé. This was another specimen received later.

The early reports for Chiriquí and Veraguas are mentioned above. In the Canal Zone, Goldman collected a male in the hills near the western end of the dam at Gatun on January 21, 1911, and another was taken by Chapman and Potter on Barro Colorado Island, January 7, 1926. In the eastern area of the Province of Panamá I secured 2 on Cerro Chucantí on March 14 and 18, 1950. In Darién, Benson shot a male at Cana in 1928, and I have the head of another taken on

Cerro Pirre, February 2, 1961, by C. M. Keenan. I secured 1 at the mouth of the Tuquesa on the Río Chucunaque March 28, 1959. On Cerro Tacarcuna in 1964, 1 specimen that had been badly shot was brought to me on February 25, and C. O. Handley, Jr., collected another on March 11, both at 1,450 meters. In the San Blas, Griscom (Bull. Mus. Comp. Zool., vol. 72, 1932, p. 325) recorded specimens taken by von Wedel at Permé and Puerto Obaldía. Handley collected a male on the Quebrada Venado, back of Armila, on March 23, 1963.

The ground cuckoo is an inhabitant of heavy stands of forest. In my few personal encounters, I have found it always on the ground

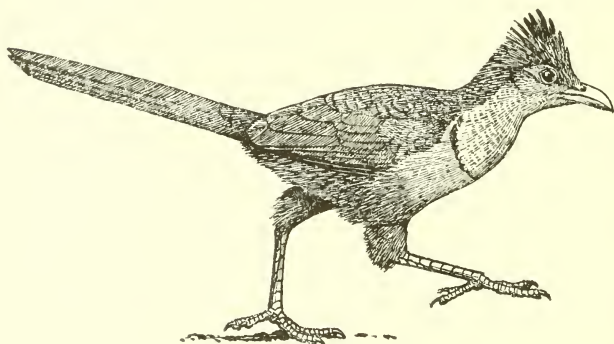


FIGURE 19.—Rufous-vented ground cuckoo, hormiguero montañés, *Neomorphus geoffroyi salvini*.

in fairly open undergrowth, alone, or rarely in pairs. Usually they are seen as they stand motionless, often on the edge of a quebrada or other broken ground in hilly areas. Sometimes they run rapidly over the dry leaves, and then may produce a crackling, popping noise like the explosive sounds of Gould's manakins but louder, given continuously for a short period, produced by snapping the strong mandibles. They also utter a low croaking note. I have never seen one use its wings in flight.

The stomach of 1 specimen taken at the mouth of Río Tuquesa was crammed with 2 full grown scorpions, entire, including the sting on the end of the tail, and 8 or 10 large roaches. Another on Cerro Tacarcuna held quantities of very finely ground insect remains, mixed with small, hard, round seeds.

The bodies of those that I have prepared have not given off the rank, disagreeable odor found in anis and some related species. One that lay on the skinning table from mid-forenoon to 6 o'clock in the evening in a temperature of 90°F. did not decompose in the least.

Information on the breeding of these large cuckoos is scant at present. Though it has been supposed that they might be parasitic, Sick (Orn. Biol. Wiss., 1949, pp. 235-236) has recorded a pair accompanied by a young bird, evidently under their care. He cites also an observation by Dra. Emilia Snethlage that this cuckoo is suspected of having a nest. In a later publication (Arq. Mus. Nac. Rio de Janeiro, vol. 52, 1962, p. 190) Sick states that a pair observed caring for a young bird indicates normal breeding.

An egg, fully formed, taken from the oviduct of a specimen collected by M. A. Carriker, Jr., at Villa Artiaga, Antioquia, Colombia, April 25, 1950, is between elliptical and long elliptical in form, white in color, and has a slightly roughened shell. It measures 43×32 mm.

In northern Costa Rica this forest species is known as *guia león*.

Order STRIGIFORMES

Family TYTONIDAE: Barn Owls; Lechuzas de los Campanarios

The typical barn owl, *Tyto alba*, is almost worldwide in distribution in temperate and tropical lands, even to widely separated islands. It is curious that it is not resident in New Zealand, as it is present in Australia. Throughout its vast range it varies in size and in depth of color, so that numerous geographic races have been described. In outward appearance barn owls differ from the typical owls in the form of the facial disk, which is elongated and heart-shaped, instead of rounded. Another peculiarity is the serrated, comblike projection on the inner side of the claw of the middle anterior toe, a structure that is known at random elsewhere in birds, for example in herons, goatsuckers, pelicans, and cormorants. It is supposed to be used in dressing the feathers. Eggs of the typical barn owls, *Tyto alba*, are white, and as incubation proceeds, become discolored in varying amount. They are laid on any natural accumulation of trash in the shelter that houses them.

Living barn owls are of moderate size, but in Pleistocene time in the West Indies there were species as large as the largest of living typical owls.

TYTO ALBA GUATEMALAE (Ridgway): Barn Owl; Lechuza

FIGURE 20

Strix flammea var. *Guatemalae* Ridgway, Bull. Essex Inst., vol. 5, December 1873, p. 200. (Chinandega, Departamento Chinandega, Nicaragua.)

An owl with elongated, heart-shaped facial ruff; relatively few markings on the under surface.

Description.—Length 350-380 mm. Two color phases, one light, white underneath, paler above; the other tawny, distinctly buff on the lower surface, darker above. Adults (sexes alike), light phase, facial disk white, except for a cinnamon to chocolate colored spot in front of the eye, with a narrow line of feathers around the lower half that are white basally, cinnamon-buff distally, tipped narrowly with fuscous to dull black; above light cinnamon-buff on head and neck, dotted lightly with a mixed pattern of dull black, light gray, and white; back, rump, and wing coverts with a marbled pattern of dull black, gray and white, with the concealed bases of the feathers light cinnamon-buff; wings and tail light cinnamon-buff, with broken bands of dull grayish brown, tipped with white; outer pair of tail feathers

white; under surface, including under wing coverts, white with scattered dots of dark neutral gray on breast and sides.

Tawny phase, light-colored, filamentous feathers of facial disk tipped with cinnamon, with encircling band wider and darker; entire upper surface dark gray, mottled faintly with white, with scattered, short shaft streaks of black tipped with white; underlying buff darker, as also the bands on wings and tail; under surface light cinnamon-buff, with short shaft streaks of black tipped with white.



FIGURE 20.—Barn owl, lechuza, *Tyto alba guatemalae*.

Iris dark brown; bill yellowish horn color; toes, including claws, and bare area of lower end of tarsus, dull dark brown to fuscous.

Measurements.—Males (10 from El Salvador, Nicaragua, Costa Rica, and Panamá) wing 293-323 (309.3), tail 114.0-136.7 (126.5), culmen from cere 19.7-22.5 (21.4), tarsus 67.8-77.2 (73.5).

Females (10 from Guatemala, El Salvador, Nicaragua, Costa Rica, and Panamá), wing 293-334 (317.2), tail 123.0-136.0 (129.6), culmen from cere 20.0-23.8 (22.3), tarsus 70.7-76.2 (73.2) mm.

Resident. Found locally in small numbers throughout the lowlands, casually in the mountains of western Chiriquí (1 record for Quiel, above Boquete at 1,550 meters); my only record for Darién is of 1 calling at night on the Río Chucunaque, near the mouth of the Río Tuquesa.

In the towns, *lechuzas* are regular inhabitants of suitable shelters about church towers and other buildings. In country areas they are found especially in palm trees scattered through pasturelands. Rarely, I have encountered them while night hunting, when their eyes glow light golden yellow in reflected light. It has been more usual to record them from their calls heard during the night about our quarters in small towns, and from occasional glimpses of birds seen flying at dusk. At Soná, Veraguas, where I found barn owls regularly both in the town and in the country, one evening one flew into the brilliantly lit church to perch on a beam where it remained for several minutes. At Chepo they nested in a gable opening in the Alcaldía. Those that I secured for specimens all had the stomach empty. Elsewhere the barn owl is known to feed on mice, other small mammals, and to a lesser extent on small birds and large insects.

The race *Tyto a. guatemalae* ranges from western Guatemala through southern Central America, to northern Colombia. It differs from *Tyto alba pratincola* of North America and northern Central America only in having slightly darker color.

Family STRIGIDAE: Typical Owls; Buhos y Buhitos

The family of owls, distributed through the world (except in Antarctica) is universally known by name, but its species are seldom seen except by woodsmen as they are mainly active in the darkness of night. They are known to others through their calls, abrupt and loud in many species, musical trills in others. As the authors are unseen they are the base, worldwide, of many curious beliefs and superstitions. Of the 123 species living through the World 14 are found in the Isthmus of Panamá. One of these, the burrowing owl, is a casual migrant from the north. Four others are rare and little known even to naturalists. All are predatory, the larger kinds feeding on small mammals, birds, lizards, and large insects, mainly orthoptera. The smaller ones are insectivorous, but also take other prey. Food is swallowed in lumps, with bones, feathers, fur, and other indigestible parts formed into pellets, which are regurgitated in due course to make room in the stomach for the next meal. Owls hunt with ease on the darkest of nights, guided by acute hearing that detects the slightest sound, even more than by sight.

One species found in Panamá, the striped owl, nests on the ground. The other residents, so far as is known, use hollows in trees. All lay eggs that are elliptical in form and white in color without markings.

The history of the order begins with several forms of the Eocene epoch so that the group has a record of more than 50 million years.

KEY TO SPECIES OF STRIGIDAE

1. Head with distinct feather tufts in the form of horns, placed on either side of the crown 2
Crown smoothly feathered, without projecting feather tufts 7
2. Toes feathered nearly to the end of the distal joint 3
Toes bare, without feathers 4
3. Size large, wing more than 300 mm.; prominently barred on lower surface, a mottled pattern above.
Great horned owl, *Bubo virginianus mesembrinus*, p. 162
Smaller, wing less than 250 mm., heavily streaked above and below.
Striped owl, *Rhinoptynx clamator forbesi*, p. 180
4. Size large, wing more than 250 mm.; ear tufts very long, streaked broadly with buff or white.....Crested owl, *Lophostrix cristata*, p. 158
Smaller, wing less than 200 mm.; ear tufts short with mottled pattern like rest of crown..... 5
5. Lower half or more of tarsus bare.
Bare-shanked screech owl, *Otus clarkii*, p. 155
Tarsus feathered nearly to the toes..... 6
6. Lower surface clearly streaked, with definitely marked crossbars; underside of wing strongly barred.....Chóliba screech owl, *Otus choliba*, p. 150
Lower surface with less definite streaks, more of a mottled pattern; underside of wing less definitely barred.
Vermiculated screech owl, *Otus guatemalae vermiculatus*, p. 148
7. Size large, wing more than 208 mm..... 8
Size small, wing less than 200 mm..... 10
8. Chest with a broad dark band; lower breast and abdomen plain, or with a very few narrow dark bars.
Spectacled owl, *Pulsatrix perspicillata*, p. 163
Lower surface heavily barred or streaked..... 9
9. Breast, abdomen and sides buff to buffy white, heavily streaked.
Mottled owl, *Ciccaba virgata*, p. 174
Lower surface white, heavily barred with black.
Black-and-white owl, *Ciccaba nigrolineata*, p. 178
10. Legs slender, long, sparsely feathered, extending beyond end of tail; a terrestrial species....Burrowing owl, *Speotyto cunicularia hypugaea*, p. 173
Legs relatively strong, short, heavily feathered, not reaching to end of tail; arboreal species..... 11
11. Larger, wing more than 130 mm.; coloration plain, without streaks or bars above or below.
Central American saw-whet owl, *Aegolius ridgwayi ridgwayi*, p. 183
Smaller, wing less than 100 mm.; more or less streaked, spotted or barred 12
12. Crown with definite longitudinal streaks, in some restricted mainly to the forehead.
Ferruginous pygmy owl, *Glaucidium brasilianum ridgwayi*, p. 171
Crown marked with many small spots..... 13

13. Back plain, except for a few partly concealed spots; sides plain brown without markings.

Least pygmy owl, *Glaucidium minutissimum rarum*, p. 167

Back and sides spotted, barred or streaked.

Mountain pygmy owl, *Glaucidium jardinii costaricanum*, p. 169

OTUS GUATEMALAE VERMICULATUS (Ridgway):
Vermiculated Screech Owl; Buhito Jaspeado

FIGURE 21

Megascops vermiculatus Ridgway, Proc. U.S. Nat. Mus., vol. 10, August 1, 1887, p. 267. (Costa Rica)

A small eared owl, smaller than the Chóliba screech owl, darker colored, and more mottled, less definitely streaked.

Description.—Length 205-225 mm. With gray and rufous color phases. Gray phase, adult (sexes alike), above definitely brownish gray, the feathers with crossbars of black that join along the midrib, and lateral bars of buff, (producing a mottled appearance, without the clearly outlined black streaks seen in *Otus choliba*); bend of wing, and outer edge of some of the wing coverts, white; primaries barred narrowly with black, and more broadly with cinnamon-buff, mixed on the outer web with a few scattered partial bars of white, with tips mottled with fine irregular spots of dull neutral gray; secondaries similar, but with white reduced or absent; tail also similar, with a slight amount of white on the outer web of the outermost feather; facial disk with a black posterior border, otherwise grayish white, barred narrowly with fuscous-black; chin dull white; breast, sides, abdomen and under tail coverts white to buffy white, barred narrowly with black, with fairly definite black shaft stripes, and mottling of buffy brown and gray; feathered tarsi grayish white barred narrowly and indefinitely with blackish brown; inner under wing coverts extensively white, outer ones mottled like the sides of the breast; under surface of wing feathers with barring reduced or nearly absent (differing thus from the more definite barring of *Otus choliba luctisonus*).

Rufous phase, strongly rufous-brown on the entire upper surface with the prominent markings of the gray phase usually much reduced or nearly absent; crown, hindneck, and upper back lined very narrowly and indistinctly with black (not heavily as in the Chóliba screech owl); lower surface somewhat less rufescent, usually browner on the neck, breast, and sides, less so on the abdomen; otherwise like the gray phase.

Color differs considerably so that individual birds may be intermediate in varying degree between the extremes of gray and brown.

Downy young, dull buffy brown; upper surface, foreneck, and breast barred narrowly and rather indistinctly with dull fuscous-black; lower breast, abdomen, and flanks with the down feathers tipped with grayish white.

The colors of the eye, bill, and feet are similar to those of the Chóliba screech owl.

Measurements.—Males (6 from Panamá), wing 148.0-163.0 (155.0), tail 71.2-76.4 (74.1), culmen from cere 14.0-14.9 (14.4), tarsus 26.4-30.4 (28.3) mm.

Females (8 from Panamá), wing 153.3-162.2 (156.5), tail 73.1-



FIGURE 21.—Vermiculated screech owl, buhito jaspeado, *Otus guatemalae vermiculatus*.

79.4 (76.8), culmen from cere 14.0-16.7 (15.1), tarsus 27.9-30.6 (28.9) mm.

Resident. Found through the Tropical Zone forests, ranging upward to lower Subtropical Zone regions. Recorded on the Pacific slope in Chiriquí (Divala, Boquete); Veraguas, (Calovévora, Chitra); the eastern sector of the Province of Panamá (Utivé); Darién (Jaqué, Cerro Pirre, Cerro Malí, La Laguna). On the Atlantic side in Bocas del Toro (Almirante, Río Changuena); and in the Canal Zone (Río Trinidad, now submerged in Gatun Lake, near Trinidad Island).

The above, based on specimen records, indicates a distribution throughout the Republic, but mainly in hill country. In addition, Dr. Eisenmann and others have heard the calls of screech owls that they attributed to this species on Barro Colorado Island. In my own observations I have heard them in the eastern area of the Province of

Panamá at Charco del Toro, inland on the Río Majé, and on the south base of Cerro Chucantí; also on the Río Boquerón near the Peluca Hydrographic Station, and on the Río Pequení near Candelaria. In Darién I have noted them on the upper Río Jaqué, in the Tuira Basin at Boca de Paya on the Río Tuira, and near the mouth of the Tuquesa on the Río Chucunaque.

The 1 specimen reported for Lion Hill by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 3, 1897, p. 21), based on an individual in the British Museum, collected by McLeannan, I find is *Otus choliba luctisonus*. The report by Eisenmann (Smithsonian Misc. Coll., vol. 117, no. 6, 1952, p. 24) that this owl has been "collected at Frijoles" is based on Ridgway (U.S. Nat. Mus. Bull. 50, pt. 6, 1914, p. 726). This may refer to McLeannan's early work, but I know of no specimens with the locality in question. The valid Canal Zone record listed above is of 1 in the U.S. National Museum, taken on the Río Trinidad by August Busck in May 1911.

The call that I have identified as that of this species is a quavering trill, rather prolonged, similar in cadence from beginning to end, with no differing emphasis in any part. I have heard it always in forest, usually in the lower tree crown. As the eyes of this species do not shine in reflected light, I have never been able to locate them when hunting with electric head lamps at night.

Near Utivé, at the south base of Cerro Azul, on March 19, 1949, my companion W. M. Perrygo had shot a small bird, and with two Panamanians, I stood watching him clean the feathers preparatory to placing it in a paper cone for safe carriage. Presently, I saw a small vermiculated screech owl watching us from a tree perch only 5 or 6 meters distant. The bird rested with head bent forward, feathers pressed closely on head and body, and the ear tufts displayed so prominently that at first glance, in the dim forest light, I took it for a small mammal. It was a female with a forming egg nearly ready for the shell in the oviduct.

I have no information on the nesting of this species.

**OTUS CHOLIBA (Vieillot): Chóliba Screech Owl;
Buhito Rayado**

FIGURE 22

Strix choliba Vieillot, Nouv. Dict. Hist. Nat., Nouv. éd., vol. 7, March 1817, p. 39. (Paraguay.)

A small eared owl, with definite longitudinal streaks, prominent

on under surface, less evident on back and scapulars; under surface of primaries, especially the outer ones, definitely barred.

Description.—Length 215-235 mm. Usually gray, rarely in rufous phase; projecting feathers, the "horns," on either side of the crown, rather short but prominent. Gray phase: adult (sexes alike), above somewhat brownish gray, with longitudinal shaft lines of black, and small indistinct crosslines and mottling of pale cinnamon-buff; a prominent line of white on the outer side of the scapulars, and another narrower one on the outer greater wing coverts; primaries banded widely with cinnamon and dull black, mottled with buff; tail banded narrowly with cinnamon-buff, bordered with dull black; face



FIGURE 22.—Chóliba screech owl, buhito rayado, *Otus choliba*.

light gray, barred narrowly with fuscous-black; facial disk with a black posterior border; forehead and a superciliary line gray (indistinct in some individuals); under surface light gray, with prominent shaft lines and narrow crosslines of black to fuscous-black; feathered tarsi buff, barred more or less with brownish black; under wing coverts buff, barred with brownish black; under surface of wing dull brownish black, barred broadly and definitely on inner and outer webs with cinnamon-buff.

Rufous phase: rufous brown on upper surface, with the usual black lines; face, and occasionally the entire under surface, rufescent.

Downy young, grayish white on hatching, changing immediately to a second stage in which the slightly grayer down is banded narrowly with fuscous.

Uncertainty in earlier work as to the characters that identify the

two smaller screech owls found in Panamá, due partly to the few specimens available, has been dissipated through the studies of Joe T. Marshall (West. Found. Vert. Zool., Monogr. 1, 1967, p. 4). His manuscript notes, to which he kindly gave me access, allowed me to identify my specimens and notes without difficulty.

The Chóliba is the more common of the screech owls found in the Republic. Birds of this species on the mainland, where they are widely distributed on the Pacific slope, appear uniform in characters of size and color (variable only in gray and rufescent phases). It has been interesting to find that those of Isla del Rey in the Archipiélago de las Perlas agree with the subspecies widespread in northern Colombia. Thus there are two forms in the Republic. The species in its entirety ranges from Costa Rica through Panamá to Bolivia, northern Argentina, Uruguay, and southeastern Brazil. Several other races in addition to the two found in Panamá are recognized.

OTUS CHOLIBA LUCTISONUS Bangs and Penard

Otus choliba luctisonus Bangs and Penard, Proc. Biol. Soc. Washington, vol. 34, June 30, 1921, p. 89. (Escazú, Costa Rica.)

Characters.—Smaller; male, wing 152-165, tail 79-84 mm.; female, wing 155-170, tail 75.0-90.5 mm.; averaging slightly paler in color on upper surface.

A male taken January 28, 1962, at Guánico Arriba, Los Santos, had the iris clear yellow; rim of eyelids dull brown with a yellowish cast; top of cere and hooked tip of maxilla dull honey yellow; rest of bill and sides of cere dull greenish gray; bare lower end of tarsus and claws brownish neutral gray.

Measurements.—Males (6 from Panamá), wing 152-165 (158.5), tail 79.9-84.0 (81.4, average of 5), culmen from cere 13.6-14.4 (14.0, average of 5), tarsus 29.5-32.0 (31.1) mm.

Females (10 from Costa Rica, Panamá, and Chocó), wing 155-170 (162.5), tail 75.0-90.5 (84.9), culmen from cere 13.6-15.9 (14.4), tarsus 31.0-34.8 (33.0) mm.

Resident. Locally fairly common on the Pacific slope, mainly in the lowlands, from western Chiriquí through the Canal Zone; recorded only as follows: Chiriquí (Progreso, Divalá, Buena Vista above Concepción); Veraguas (Soná, Chitra); Coclé (Natá, Antón); Herrera (Parita); Los Santos (Guánico Arriba); western Province of Panamá (Bejuco); Canal Zone (Fort Kobbe, Pedro Miguel, Ancon and Sosa hills, Juan Mina).

The localities cited above are based on specimens. In addition, I have heard screech owls that I believed to be this species on Barro Colorado Island, near El Uracillo, Coclé, and at the Quebrada Venado near Armila, San Blas. The specimens from Juan Mina are the only ones seen from the Caribbean drainage. The other reports from that area are based on calls of birds heard at night, and so are subject to verification. This race of *Otus choliba* ranges south into western Colombia, where it is found near Unguía, Chocó, a short distance beyond the Panamanian boundary.

At present this is the best known of the three screech owls found in Panamá, and may be the most abundant in number of individuals. It seems more adaptable than the other two, as in its main range in the Pacific lowlands west of the Canal it appears able to adjust to shelter in groves and thickets, and even in orchards as forest cover is cleared. I have found them in tall hedge rows bordering pastures, and in thickets of second growth adjacent to cultivated farms. At night I have heard them calling regularly from scattered orange trees near the small houses that have served me as temporary quarters.

The call begins with a rippling trill, similar to that of the vermiculated screech owl, but terminates in an abrupt, explosive whistle, sometimes uttered twice in rapid sequence, *kao* or *kao, kao*. This abrupt note serves to identify the present species without question. The birds are heard mainly in the evening at full dark, but may call at intervals through the night. Sometimes they remain silent during hours of bright moonlight, and on other such occasions are vocal. At a distance the abrupt call at the end of the trill may resemble a barking sound.

On March 16, 1958, near Antón, Coclé, as I followed a cattle trail beside a fence in woodland on the banks of the Río Estancia, a small owl flew out of a hole in a tree to hide in the adjacent undergrowth. I stalked it and shot it to find that it was the present species. On examination of the hole I found that the bird had come from a nest that held 2 eggs. The cavity, about 30 centimeters deep, was a natural one, 1½ meters from the ground in a fork of one of the quick-growing trees that are cut for fence posts, and that regularly take root. The opening was barely large enough for me to insert my hand. The eggs rested on fine bits of decayed wood. In one incubation had begun, while the other was recently laid. In form, one is rounded elliptical, the other short subelliptical. Both are white, without gloss. They measure 34.0×29.5 and 34.9×28.4 mm. A nest found January 1, 1915, by Hallinan (Auk, 1924, p. 312), on the trail between Culebra and

Arraiján, was in the top of a decayed palm stub, about 3 meters high. The 3 eggs, now in the American Museum of Natural History, are rather dull white, elliptical in form, with the shell faintly granular. The measurements are as follows: 33.7×28.9 , 33.9×29.6 , and 34.6×29.8 mm. The nesting season may be irregular, as in 1948 in Herrera I secured partly fledged young on February 28, March 12, and March 23.

Stomachs of those collected have been filled with finely broken fragments of large orthoptera and large scarabaeid beetles. Hallinan reported a specimen taken May 23, 1916, on Sosa Hill in the Canal Zone, that had many leaf-cutting ants in the stomach.

OTUS CHOLIBA CRUCIGERUS (Spix)

Strix crucigera Spix, Av. Spec. Nov., vol. 1, 1824, p. 22, pl. 9. (Rio Amazonas, Brazil.)

Characters.—Larger; male, wing 166-173, tail 85.9-92.4; female, wing 172-179, tail 92.8-96.5 mm.; averaging slightly darker in color on upper surface.

Measurements.—Males (5 specimens), wing 166-173 (170), tail 85.9-92.4 (89.0), culmen from cere 13.7-14.5 (13.9), tarsus 33.7-35.0 (34.8) mm.

Females (3 specimens), wing 172-179 (176), tail 92.8-96.5 (94.7), culmen from cere 14.8-15.2 (15.0, average of 2), tarsus 33.8-35.6 (34.8) mm.

Resident. Recorded in the Archipiélago de las Perlas on Isla del Rey and Isla Pedro González.

The specimens available to me, all collected by W. W. Brown, Jr., on Isla del Rey, include 7 in the Museum of Comparative Zoology, and 1 (obtained by exchange) in the American Museum of Natural History. Bangs (Auk, 1901, p. 25) reported that the collector had taken a pair from a hole in a dead tree on May 8, 1900. The others were secured in February and March 1904. Rendahl (Ark. Zool., 1920, pp. 31-32) recorded a male, taken by Bovallius, on Isla Pedro González, April 24, 1882, with measurements of wing 173 and tail 96 mm., that agree in size with the small series from Isla del Rey. There is no recent report from the Pearl Islands.

The larger size of these birds compared to *luctisonus* of the mainland is obvious from the tabulation of measurements. They also are darker in color. In both of these elements they resemble the subspecies *crucigerus* widely spread from the upper and middle Magdalena Valley in central Colombia east to Venezuela, the Guianas, and the

Amazon Valley. It is possible that the Pearl Islands birds may represent an undescribed form, but this should be determined when more information is available. For the present it seems desirable to assign them to the *crucigerus* group.

It is probable that the ancestral birds of the Pearl Islands came to that area during the Pleistocene at a time when lowered sea level joined the present island group with the mainland. It should be noted that the race *luctisonus*, widespread through Panamá, also occupies northwestern Colombia to the west of *crucigerus*.

OTUS CLARKII Kelso and Kelso: Bare-shanked Screech Owl;
Buhito en Pernetas

FIGURE 23

Otus clarkii Leon Kelso and Estelle H. Kelso, Biol. Leaflet, no. 5, November 8, 1935, [p. 2]. (Calobre, Veraguas, Panamá.)

A small eared owl, larger than the other screech owls of Panamá; only the upper two-thirds of the tarsus feathered, the lower section and the toes being bare.

Description.—Length 230-255 mm. Color as a whole warm brown to brownish gray, varying from light to dark. Rufescent phase: adult (sexes alike), above cinnamon-brown to dull tawny brown; crown with heavy shaft lines of black; elsewhere with black markings mainly in the form of crossbars, connected in varying degree along the line of the shaft; hindneck with partly concealed markings of buff that form an indefinite half-collar; rump and upper tail coverts slightly paler than the back; wing coverts, especially the primary coverts, strongly black; middle and greater coverts and scapulars edged with white, forming prominent, broken streaks; primaries and secondaries fuscous, barred, mainly on the outer webs, with light cinnamon-buff varied with white; tail fuscous-black, barred narrowly with cinnamon-buff; ear tufts usually with a few spots of white to buffy white; facial disk cinnamon-brown, with shaft lines and an indefinite lower border of black; chin white to buff; lower surface cinnamon-brown, with fairly definite black shaft streaks, irregular narrow crossbars of black bordering the brown, and partly concealed spots of white; abdomen and under tail coverts paler than breast and sides, from an increase in the extent of the white, which here forms definite streaks; feathers of upper two-thirds of tarsus cinnamon-buff, lightly barred with fuscous; under wing coverts cinnamon-buff, barred and lined with black; under surface of wings fuscous, with

the outer webs barred with cinnamon-buff, and the inner webs usually plain.

Gray phase: lighter, buffy brown above; lighter below, with the base color of the lower breast and abdomen white, and the paler markings buff.

Young, down basally buffy white, tipped with white, barred narrowly with dull cinnamon, the barring broader and more widely spaced than in *Otus guatemalae vermiculatus*. The first stage is followed immediately by a second juvenile plumage that above is cinnamon-buff, brighter on the crown, duller on the back, barred with

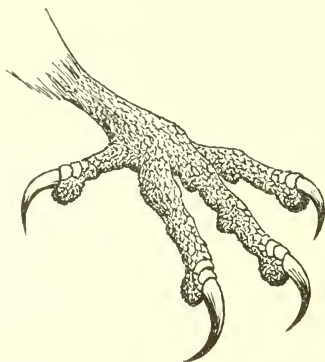


FIGURE 23.—Foot of bare-shanked screech owl, buhito en pernetas, *Otus clarkii*, showing partly feathered tarsus.

dull fuscous-brown; below buff, tipped with white, and barred indistinctly with dull fuscous.

A male that I secured on Cerro Malí, Darién, March 3, 1964, had the iris bright yellow; top of cere and tips of maxilla and mandible dull light honey yellow; rest of cere pale dull brownish gray; rest of bill dull greenish neutral gray; bare area of tarsus dull brownish white; toes dull yellowish white; claws black, with the bases dull brownish white. Another male, captured in a mist net at 1,980 meters on the west base of Volcán Barú, Chiriquí, March 5, 1965, had the iris clear yellow; bare rim of the eyelids black; cere buffy brown; bill pale dull green; lower end of tarsus and toes pale buffy brown; claws like toes, except that the distal half on top was dull black.

Measurements.—Males (9 from Costa Rica and Panamá), wing

177-182 (179.8), tail 90.2-106.4 (96.2, average of 8), culmen from cere 11.3-16.7 (14.6), tarsus 33.0-37.8 (35.3) mm.

Females (10 from Costa Rica and Panamá), wing 176-184 (182.8), tail 91.8-108.3 (98.4), culmen from cere 14.0-16.6 (14.6, average of 9), tarsus 32.5-37.0 (34.8) mm.

Resident. Rare in the Subtropical Zone; recorded in Chiriquí (Volcán Barú); Veraguas (Calobre); and Darién (Cerro Pirre, Cerro Malí, Cerro Tacarcuna, La Laguna).

This interesting owl is recorded in literature mainly from specimens collected in Costa Rica, where it is called *estucurú*, but with little information concerning its habits, except that it is a bird of the higher mountain forests. On Cerro Malí in the serranías of eastern Darién, we caught one March 3, 1964, in a mist net set at 1,450 meters elevation in the forest above our camp. On this same day one of the Panamanians with C. O. Handley, Jr., brought me another male from 1,460 meters on the crest of the ridge of Cerro Tacarcuna. The bird was taken exactly on the line of the boundary between Panamá and Colombia, so that it serves as a record for both Republics. Two additional specimens collected on Cerro Malí, May 30, 1963, by Dr. Pedro Galindo and his associates from the Gorgas Memorial Laboratory, include an adult bird with sex not marked, and a juvenile female that is nearly grown.

Regularly at night while in camp at this high elevation, I heard an owl that I was certain was this species, since I was familiar with the notes of the other members of this family found there. The call was in two parts, a single note, a brief pause, then the same syllable repeated rather quickly three times, *coo*, *coo-coo-coo*, the whole rather high in sound, and quite musical.

Stomachs of the specimens taken were empty. One shot May 5, 1912, by E. A. Goldman at 1,525 meters on Cerro Pirre, near the head of Río Limón, had eaten 3 large scarabaeid beetles and 2 orthopterons.

I know of no record of the nest and eggs.

In its early history this owl was known as *Otus nudipes*, a name that applies properly to another species with the lower end of the tarsus bare, found in the West Indies in Puerto Rico and certain of the Virgin Islands. When Dr. and Mrs. Kelso brought this to attention and named the present bird *Otus clarkii* they referred to Sharpe's account of it in volume 2 of the *Catalogue of Birds in the British Museum*, pages 121-122, published in 1875. Here Sharpe stated that his description was written "from a specimen obtained at Calobre, in

Veragua, by Arcé, and kindly lent to me by Mr. Salvin." This bird, therefore, is the type specimen. When the Salvin collection was presented to the British Museum (Natural History), the skin was cataloged as no. 88.7.20.56. It is labeled only Calobre, Veraguas, 1869, E. Arcé, 2594, without indication of sex. Its measurements are as follows: wing 172, tail 97, culmen from cere 17.2, tarsus 38 mm. It is one of the brighter brown individuals of this species. This has been the only record for western Panamá until 1965, when E. Tyson collected 2 on the west slopes of Volcán Barú on February 19 and 23 at about 2,250 meters elevation. I secured another on the same side but lower down at 1,980 meters on March 5. These birds were taken in mist nets. Beyond Panamá to the west this owl ranges in the higher mountain forests of Costa Rica.

Those seen from Darién do not differ in color or size from the birds examined from western Panamá and Costa Rica.

LOPHOSTRIX CRISTATA (Daudin): Crested Owl;
Buho Penachudo

FIGURE 24

Strix cristata Daudin, *Traité Orn.*, vol. 2, 1800, p. 207. (Guiana.)

A large owl, dark to medium dark in color, with long, prominent feather horns, that when not erect form a distinct white or buffy white streak along the side of the crown.

Description.—Length 360-390 mm. Two color phases, one rather uniform dark brown, the other paler, buffy brown. Dark phase: adult (sexes alike), above sooty brown, paler, more cinnamon-brown on the wings, mottled finely throughout with dark cinnamon and rufous; scapulars with partly concealed bars and spots of white to buff, in the form of irregular streaks; wing coverts spotted and barred with white and buff; primaries and secondaries barred with cinnamon-buff and white; tail barred narrowly with cinnamon-buff and white, less prominently on central feathers and toward tip; slender feathers at base of bill white, with black shaft lines and tips, continued in a prominent white or buffy stripe over the eye to the long feather horns where it is mixed with dark brown; feathers of face rufous at base, black at tip; chin white, center of upper breast basally white, this partly concealed; neck, breast, abdomen, and sides buff to buffy white, barred narrowly with dark brown and fuscous to produce a mottled appearance; lower abdomen, under tail coverts, tibia and tarsus buff, the legs in some barred indistinctly with blackish brown, in other individuals plain; under wing coverts buff, with some mottling

or barring with blackish brown; under surface of wings brownish gray, barred with buff, under wing coverts pale cinnamon-buff; under surface of tail dull brownish gray, barred narrowly with white, and mottled indistinctly with dusky.

Light phase: paler, more buffy brown above and below, with light markings usually more prominent.



FIGURE 24.—Crested owl, buho penachudo, *Lophostrix cristata*.

Juvenile, not seen.

Little is known of these interesting owls, except that they are forest inhabitants, found usually in hill country. My only definite observation is of one encountered near Zapotillo in western Veraguas, in a small tract of trees on a slope above the Río Bubí. Here it rested in rather dense undergrowth 2 meters from the ground. I believed that owls flushed in trees along quebradas, and seen indistinctly, near Pucro, Darién, were this species, but was not certain. Strange, distant

calls heard at night near Armila, San Blas, were unfamiliar, and may have come from this owl.

Two subspecies are found on the Isthmus, one in the west, and the other in the east.

In South America, the crested owl ranges through Colombia to eastern Ecuador, and from the Guianas to the Amazon Valley in Brazil. The Penards (Vog. Guyana, vol. 1, 1908, p. 462) say that it nests in hollows in trees. Schönwetter (Handb. Ool., pt. 10, 1964, p. 611) gives variation in size in 6 eggs in the typical race as follows: $43.7-48.5 \times 37.2-38.6$ mm.

LOPHOSTRIX CRISTATA STRICKLANDI Sclater and Salvin

Lophostrix stricklandi P. L. Sclater and O. Salvin, Ibis, vol. 1, July 1859, p. 221. (Verapaz, Guatemala.)

Characters.—General coloration somewhat lighter, with white in the scapular area more extensive; superciliary streak and the feather horns mixed more with darker colors, with white less extensive.

Van Rossem (Dickey and van Rossem, Birds El Salvador, 1938, p. 230) records the colors in one taken on Cerro Cacaguate, El Salvador, as follows: "Iris reddish brown; cere grayish olive; feet pale flesh color; claws black terminally, horn color at base; bill black with ridge of culmen and tip, and mandible from angle of gonys to tip, flesh color."

Eye color may be variable as Heyde and Lux on the label of a female taken at Natá, Coclé, note it as yellow, and Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 3, 1897, p. 14) says that the iris was bright yellow in 2 from Guatemala.

Measurements.—Males (6 from Nicaragua, Costa Rica, and Panamá), wing 278-292 (284.5), tail 159-179 (167.1), culmen from cere 18.0-19.5 (18.5), tarsus 43.0-48.4 (45.3) mm.

Females (6 from Chiapas, Costa Rica, and Panamá), wing 280-292 (287.6), tail 167-180 (174.1), culmen from cere 18.0-20.0 (18.9), tarsus 47.9-50.6 (48.9) mm.

Resident. Rare in forested areas, in western Panamá. Recorded from Chiriquí (Divalá, Bugaba); Veraguas (Zapotillo, Santa Fé); Coclé (Nata); Bocas del Toro (Río Cricamola).

The record for Zapotillo is of a female that W. M. Perrygo and I collected on May 19, 1953. The specimen from Natá, Coclé, is a fe-

male in the U. S. National Museum taken January 9, 1889. Another female in the collections of the University of California at Los Angeles was secured January 16, 1938, on the Río Cricamola about 25 kilometers inland from the coast.

As this owl has not been collected east of Coclé 2 sight records on Barro Colorado Island, 1 in 1929 and the other in 1948, remain to be verified. To the north this race ranges to southern México.

LOPHOSTRIX CRISTATA WEDELI Griscom

Lophostrix cristata wedeli Griscom, Bull. Mus. Comp. Zool., vol. 72, January 1932, p. 326. (Permé, San Blas, Panamá.)

Characters.—General coloration darker, duller, with less white in the scapular region; superciliary streak and the feather horns more extensively white, and thus more prominent; horns longer.

Measurements.—Males (11 from Panamá and Colombia), wing 283-306 (294.9), tail 168-189 (177.0), culmen from cere 18.5-20.8 (19.2), tarsus 47.1-51.0 (48.4) mm.

Females (3 from Panamá and Colombia), wing 285-299 (290.6) tail 170-185 (175.1), culmen from cere 17.8-20.1 (19.0), tarsus 45.1-48.0 (46.8) mm.

Resident. Local in eastern Panamá; recorded in Darién (Yaviza, taken by P. L. Slattery; Aruza; Cerro Pirre to 600 meters); and San Blas (Permé, Ranchón, Puerto Obaldía).

Near Cana, on Cerro Pirre, Goldman secured 2 specimens in the lower edge of the Subtropical Zone, the only record outside the lowlands. In the preserved stomach of one of these I found fragments of several large roaches, bits of locustids, and 3 cerambycid beetles of large size. Goldman's notes record a caterpillar, orthoptera, and bits of beetles in the other.

Several specimens taken by Wedel in the eastern San Blas make it probable that distant nocturnal calls heard at our camp at Quebrada Venado near Armila, that I did not recognize, may have come from these owls.

Beyond Panamá this race has a considerable range in northwestern Colombia, from Chocó and the eastern side of the Gulf of Darién to the middle Magdalena Valley.

This race is named for Hasso von Wedel who collected the type material.

BUBO VIRGINIANUS MESEMBRINUS Oberholser:
Great Horned Owl; Buho Cornudo Grande

Bubo virginianus mesembrinus Oberholser, Proc. U.S. Nat. Mus., vol. 27, January 22, 1904, pp. 178 (in key), 179. (San José, Costa Rica.)

Largest of the horned owls, with a prominent white throat patch, and barred under surface; horns black and buff.

Description.—Length 460-520 mm. Adult (sexes alike), above sooty brown to dusky, with feathers basally barred and mottled coarsely with grayish and cinnamon-buff to produce a variegated pattern; crown feathers with broad but irregular black streaks spotted with grayish white; horns solid black at ends and in centers, spotted with grayish white distally and cinnamon-buff at base; wing coverts and scapulars heavily mottled with grayish white; primaries and secondaries sooty brown, with broad light bars of buffy white mottled with grayish brown; rectrices centrally like scapulars; outer feathers barred like the primaries; spinous feathers at base of bill and above eye dull white tipped with dusky; rest of face dull buff tipped with buffy white, bordered behind by an indistinct rim of black; chin and lower edge of facial disk dull white; upper throat cinnamon-buff lined heavily with sooty brown; lower throat and foreneck white; rest of lower surface, including the under tail coverts, barred narrowly with sooty brown, more broadly with white, with the feathers cinnamon-buff basally; tibia cinnamon-buff with a few narrow, dusky bars; feathered tarsi and toes buffy white, in some birds nearly plain, in others with scattered narrow bars of sooty brown; under wing coverts mixed white and cinnamon-buff, barred and spotted with sooty brown.

The downy young of great horned owls, so far as they are known, are dull buff, barred narrowly and sparingly with sooty brown and dull black.

The iris in this species is bright lemon yellow; bill dull slaty black; claws black at end, lighter at base.

Measurements.—Males (6 from Oaxaca, Guatemala, Honduras, and Veraguas) wing 329-339 (334.2), tail 186-195 (189.5), culmen from cere 27.1-30.0 (28.2) mm.

Females (5 from Oaxaca, Guatemala, Nicaragua, and Costa Rica), wing 341-368 (351.4), tail 188-208 (194.4), culmen from cere 25.4-30.0 (28.3) mm.

Status uncertain, presumed to be resident. Recorded from Veraguas (Chitra), and Isla Ranchería (off Isla Coiba, sight record).

The only specimen record is a male collected at Chitra, Veraguas, by E. Arcé in 1868, and sent to Salvin. I have examined this specimen,

now in the British Museum (Natural History), and find that it agrees with *Bubo virginianus mesembrinus* as defined by Webster and Orr (Auk, 1958, pp. 140-141). It is definitely dark above, especially on the crown. The measurements are as follows: wing 333, tail 191, culmen from cere 28.2 mm.

In my own field experience in Panamá I have seen the species only once. On Isla Ranchería, off the northern end of Isla Coiba, on February 4, 1956, I found a great horned owl resting in a large-limbed tree at the border of a swamp. I had a clear view of it as I came up a slippery clay bank where treacherous footing caused me to miss the snap shot that was my only opportunity to secure the bird. The owl flew off up the forested slope toward the higher part of the island where we could not find it again.

PULSATRIX PERSPICILLATA (Latham):

Spectacled Owl; Buho de Anteojos

FIGURE 25

Strix perspicillata Latham, Index Orn., vol. 1, 1790, p. 58. (Cayenne.)

A large owl, without feather horns; sooty brown to black above, with a broad dark band across the light-colored breast.

Description.—Length 450-500 mm. Adult (sexes alike), above sooty brown; primaries and secondaries barred indistinctly with grayish brown; tail also barred with grayish brown and tipped narrowly with grayish white; feathers at base of bill, a prominent superciliary, and throat white; face, chin, and a broad band across breast sooty black to sooty brown; rest of under surface, including under wing coverts, tarsus, and toes buffy white to buff; some individuals with a few narrow dark bars on breast and sides.

Juvenile, face and chin sooty black to sooty brown; body down buffy white. Wings and tail develop like those of adult, but wing coverts and back in first stage are buffy white, barred with brownish gray.

As a species these owls range from southern México through Central America, Colombia, Trinidad, and Venezuela to Bolivia, north-western Argentina, and southern Brazil. *Pulsatrix perspicillata* in series throughout the entire range shows indication of the two color phases common among owls, one faintly blacker on the upper surface, the other lighter. The difference, which is slight, is masked by the general dark pigmentation that prevails except on part of the lower surface. Several subspecies have been described on slight color differences and faint distinctions in size. The populations of Central

America on the whole are faintly blacker than those of South America. Those from southern México to western Panamá have the upper surface and the breast band darker, with partly concealed light barring on the scapulars and wing coverts. Frequently they are barred lightly with fuscous on breast and sides. These have long been recognized as the race *saturata*, named by Ridgway.



FIGURE 25.—Spectacled owl, buho de anteojos, *Pulsatrix perspicillata*.

The race *chapmani*, found from central and eastern Panamá through western Colombia to western Ecuador, has the barring on wings and lower surface found in *saturata* much reduced or absent, and has the head and hindneck blacker than the rest of the dorsal surface. It is more or less intermediate toward the nominate race of South America, differing in slightly darker color and average larger size.

Typical *P. p. perspicillata* (type locality Cayenne) from eastern Colombia and Venezuela south, east of the Andes, to the Amazon Valley in Brazil, in series is a little smaller, and averages browner.

PULSATRIX PERSPICILLATA SATURATA Ridgway

Pulsatrix perspicillata saturata Ridgway, U.S. Nat. Mus. Bull. 50, pt. 6, April 8, 1914, p. 758. (Santo Domingo, Oaxaca, México.)

Characters.—Dorsal coloration more uniform, with head only slightly darker than the back; slightly browner black in both light and dark phases; with partly concealed light barring on scapulars and wing coverts; usually barred narrowly with dusky to fuscous-brown on lower breast and sides.

Measurements.—Males (4 from Honduras, Costa Rica, and Chiriquí), wing 320-329 (323.2), tail 177-182 (179.0), culmen from cere 28.9-31.1 (30.3) mm.

Females (6 from México, El Salvador, Costa Rica, and Bocas del Toro), wing 320-347 (337.0), tail 181-211 (193.8), culmen from cere 26.7-31.5 (28.9, average of 5) mm.

Resident. Found locally in western Chiriquí and western Bocas del Toro, ranging up to 1,350 meters in the lower Subtropical Zone.

Little is known of this race of the spectacled owl in Panamá. The only specimen taken by Arcé was reported by Salvin (Proc. Zool. Soc. London, 1870, p. 216) from Bugaba, Chiriquí. I have received 2 others from this province from Dr. F. A. Hartman. Both are males, 1 from Santa Clara, taken March 4, 1958, and the other from El Volcán, February 8, 1953. These birds apparently are more common in Bocas del Toro where specimens have been taken near Changuinola and Almirante, and also inland on the Río Changuena.

PULSATRIX PERSPICILLATA CHAPMANI Griscom

Pulsatrix perspicillata chapmani Griscom, Bull. Mus. Comp. Zoöl., vol. 72, no. 9, January 1932, p. 325. (Permé, San Blas, Panamá.)

Characters.—Back, wings, and tail in general duller, somewhat grayer brownish black; head and hindneck blacker than the rest of the dorsal surface; lighter markings in scapular area much restricted, those of the wing coverts slight in extent or lacking; usually without dark barring on breast and sides, and where present this is of slight extent.

A male collected on Cerro Tacarcuna, Darién, February 25, 1964, had the iris yellow; bill dull yellow; cere pale greenish neutral gray; bare ends of toes pale yellowish white, the scutes centrally dull pale neutral gray; claws horn color at base changing to black at tip.

A female taken on the Cerro Azul, Panamá, April 25, 1949, had the iris orange-yellow; bill dull greenish yellow; cere neutral gray; bare

ends of toes light neutral gray; claws neutral gray. Another female from Cerro Pirre, Darién, taken February 2, 1961, had the iris light orange-yellow; bill light greenish yellow; bare scutes on end of toes light brownish gray centrally, bordered with dull Marguerite yellow; claws dusky neutral gray.

Measurements.—Males (10 from Panamá), wing 316-333 (324.6), tail 175-193 (181.7), culmen from cere 26.2-29.2 (27.9) mm.

Females (7 from Panamá), wing 332-344 (338.8), tail 179-197 (186.5), culmen from cere 28.0-31.4 (29.4) mm.

Resident. Found locally in forested areas throughout the lowlands, ranging upward in Darién to 650 meters in mountain areas.

Spectacled owls are strong, heavy-bodied birds, known mainly from their gruff-voiced calls heard at night from the forests. While nowhere common, they are widely distributed wherever there is sufficient tree cover to afford them shelter. They are found regularly in swampy woodlands invaded by tides, and in the savannas range in the bands of woodland along the streams. Though seen often alone, it is common to encounter male and female near one another outside the mating season. Rarely these owls are active on overcast days, when I have seen them near the ground by shaded quebradas, or when there was fog have heard them calling. It is usual in daytime to find them on heavily shaded perches immediately below the high tree crown. In night hunting occasionally they have been attracted when I was making squeaking sounds to call smaller owls, their eyes glowing dull red in the beam of the electric torch. Their call is deep in sound, uttered abruptly, *bu hu hu*, sometimes with the addition of a fourth syllable. This is easily imitated, and often the owl may reply.

Locally in Costa Rica they are called *olopopo*.

Their food includes small mammals, birds, and lizards. Chapman (Bull. Amer. Mus. Nat. Hist., vol. 58, 1928, p. 151) records their raids on the nests of Wagler's oropendola on Barro Colorado Island. One shot at night on Cerro Tacarcuna had the stomach crammed with a small arboreal rat (*Oryzomys bicolor*), the forelegs entire of a larger species (*Tylomys* sp.), a lizard, and a large orthopteran.

I have no report on the nesting of this owl in Panamá. Belcher and Smooker (Ibis, 1936, p. 18) record a nest of the closely allied race *trinitatis* in Trinidad, found April 3, 1931, placed in a hollow in a tree about 9 meters from the ground. The 2 eggs measured 50.4×42.7 and 50×42.5 mm. They are described as "rounded ovals, white, fairly glossy, with very fine granulations."

GLAUCIDIUM MINUTISSIMUM RARUM Griscom:
Least Pygmy Owl; Buhito Enano

FIGURE 26

Glaucidium minutissimum rarum Griscom, Proc. New England Zool. Club, vol. 12, May 19, 1931, p. 41. (Permé, San Blas, Panamá.)

Similar to the mountain pygmy owl but slightly smaller, with back and sides plain (without light bands), and only 3 exposed white bars on the tail.

Description.—Length 140-145 mm. Adult (sexes alike), head and hindneck dark brownish gray, with small dots of white edged narrowly with black; a partly concealed band of white and buff across the lower margin of the hindneck, terminating on either side in a small black eye-shaped spot; back and wings dark warm brown; a few small spots of buff and white on the wing coverts, and other larger ones concealed in the scapulars; primaries and secondaries with outer webs barred and spotted with buff; tail black, with 3 broken bars and a narrow tip of white; superciliary white; sides of head dark brownish gray, with indefinite white tips and bases; throat white, with this color extended on either side to beneath the auricular region; a somewhat broken band of mixed brown and black across upper foreneck; lower foreneck, a broad, longitudinal line down center of breast, and the abdomen pure white; sides broadly russet-brown, this color lined irregularly with white as it spreads over the sides of the breast; legs dull buff; under tail coverts white, with a few dusky brown lines; underside of tail white to pale buff, blotched with fuscous-brown; under surface of wings dull dark gray banded with buffy white.

Immature, crown and hindneck brownish gray without spots.

A male taken at the mouth of the Río Tuquesa, Darién, April 1, 1959, had the iris bright yellow; bill honey yellow, shaded with light olive-gray on the sides of both upper and lower mandibles; gape bright yellow; toes and bare distal end of tarsus yellow; claws black.

Another male, collected at the Peluca Hydrographic Station, Panamá, February 22, 1961, had the cere, tip of maxilla, and tip of mandible dull honey yellow; rest of bill dull greenish yellow; toes dull yellow.

Measurements.—Males (3 from Panamá), wing 88.7-90.5 (89.6), tail 46.0-48.5 (47.5), culmen from cere 10.5-11.3 (11.0), tarsus 18.0-18.8 (18.5) mm.

Female (1 from Colombia), wing 93.4, tail 43.5, culmen from cere 11.2, tarsus 18 mm.

Resident. Rare, in heavy forests of the Tropical Zone. Recorded

from eastern Province of Panamá (Río Boquerón); Darién (middle Río Chucunaque); San Blas (Permé, Puerto Obaldía).

The earliest report is by Sharpe (Cat. Birds Brit. Mus., vol. 2, 1875, p. 198) who lists one from "Veragua" (a term that included much of western Panamá in early days) collected by Arcé. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 3, 1897, p. 36) assigned this specimen to Veraguas. In examination of this skin in the British Museum I found that it was an immature bird with unspotted crown, without definite locality, sex, or date indicated on the label. The assignment to Veraguas is questionable. Griscom received 2 from H. von Wedel, taken at Permé and Puerto Obaldía, San Blas.

At the end of March 1959, near where the Río Tuquesa joins the Chucunaque in Darién, my Chocó hunter and I heard a distant, whistled note on several occasions, and finally on April 1 the call came



FIGURE 26.—Least pygmy owl, buhito enano, *Glaucidium minutissimum rarum*.

near at hand. The bird, hidden in the high tree crown, answered our imitation of its four notes, and finally came directly overhead but still remained concealed. The first call was given slowly, followed after a slight pause by three in sequence, all low in tone. Finally after nearly an hour Ángel saw the bird, took my gun, and fired. With the heavy-bodied, short-tailed specimen in hand I recognized it as this small owl. From the beginning there had been something familiar in the whistle, which then was explained as it is closely similar to that of the related pygmy owl of the north.

Ángel, the Chocó, was greatly excited by our specimen, which he identified as the macuá, a bird to which country legend attributes magic powers. He examined it admiringly and a little covetously, as he said it was worth much money in Panamá City. In the end I saved the eyes, brain, and heart intact from which, as a *brujo* (witch doctor) he would make a potent love charm. He also examined the tongue with close attention in order that he might imitate the whistle more seductively. With the owl in hand the presence of numerous small

birds that flitted about in the high branches was explained, as they had come as usual to scold this predator. I learned later that countrymen believe they are the attendants that always accompany the magical macuá, though no especial function was attributed to them. I heard one of these little owls whistling the following day. Another encounter with this species was at the Peluca Hydrographic Station on the Río Boquerón, where we caught 1 on the forenoon of February 22, 1961, in a mist net set in the forest undergrowth. At our camp at 575 meters on the Río Tacarcuna, Darién, on March 13, 1964, one called from the forest at sunset. Our Panamanian assistants identified the note as that of the "macuá," but confused the author with the Cayenne swift!

GLAUCIDIUM JARDINII COSTARICANUM Kelso:
Mountain Pygmy Owl; Buhito Serrano

Glaucidium jadinii costaricanum Kelso, Auk, vol. 54, no. 3, July 2, 1937, p. 304.
(Costa Rica.)

A small owl, without feather horns; with white-spotted crown, barred sides, and 4 exposed broken bars on the tail.

Description.—Length 145-160 mm. Brown phase: adult (sexes alike), above warm brown to sooty brown, blacker on the ends of the primaries and the tail; forehead with partly concealed white bases; crown dotted with irregular spots of white bordered very narrowly with black, some of the markings expanded laterally into indefinite bars; a narrow, mainly concealed line of cinnamon-brown across base of hindneck, with a black eyelike spot at either side; back more or less spotted and wings barred with white and buff; tail with narrow white tip, and 4 broken bars of white, with a fifth bar concealed beneath the upper tail coverts; a narrow white superciliary; feathers around eye dull brown, barred narrowly with buff, basally white; throat, foreneck, and center of breast and abdomen white; a cross band across foreneck warm brown; sides broadly bright brown, barred narrowly and indistinctly with buff and black; under tail coverts white, streaked lightly with blackish brown; legs dark buff, banded with blackish brown, mainly white on posterior surface; under wing coverts white, lined with black; underside of wing barred with white.

Rufous phase rufous-brown above and below, with the lighter markings rufous-buff, but much obscured. (The type specimen of the subspecies is in this phase).

A male from Cerro Punta, Chiriquí, had the iris bright yellow; bare upper eyelid bright greenish yellow; cere dull yellow; tip of

maxilla and a wide line along the cutting edge yellow; rest light greenish yellow; tip of mandible dull yellow; rest light dull brown; feet bright yellow; base of claws yellow, tips black.

Measurements.—Males (4 from Costa Rica and Panamá), wing 88.1-93.9 (91.2), tail 49.5-62.5 (56.1), culmen from cere 10.7-11.8 (11.0), tarsus 18.8-22.0 (20.5) mm.

Female (1 from Costa Rica), wing 97.1, tail 55.1, culmen from cere 11.0, tarsus 20.0 mm.

Resident. Rare; 1 record from the Subtropical Zone above Cerro Punta, Chiriquí, and 1 from Veraguas, of uncertain locality.

The first report of this small owl in Panamá is based on a male in the U. S. National Museum collected by H. Th. Heyde, labeled "Soná, Veraguas," February 19, 1888. As the species elsewhere is found only in the higher mountains Griscom properly questioned the assignment to this lowland locality. It is probable that it was obtained along the high divide between the Pacific and Caribbean slopes. Other birds taken by Heyde on February 3 and 6, 1888, come from a locality designated as Cascajal on the headwaters of the Río Coclé del Norte. It seems probable that the owl may have been taken in that region.

On March 19, 1965, above Cerro Punta, Chiriquí, at 2,100 meters as I descended the old trail that leads around the mountain slopes to Boquete I saw a small, heavy-bodied bird fly a few meters from a leafy tree to a woodpecker hole in a dead stub that stood at the open border of a pasture. As I watched, the bird returned to the tree, and then came once more and entered the hole. As I did not recognize it from these brief glimpses I climbed over a tangle of logs and rapped with my machete on the trunk. The bird then flew out to an open perch where I shot it.

Elsewhere this race is known from a few records in the mountains of Costa Rica. Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 133) found it on two occasions in tangled forest where it moved alertly, evidently an aggressive hunter. Like other species of the genus it was active by day.

The Phelps, father and son, in a recent review of *jardinii* (Proc. Biol. Soc. Washington, 1951, p. 66), have placed these birds as geographic races of *Glaucidium brasilianum* since populations of these two groups have not been encountered in the same range. The two are similar in general pattern, except that dark phase *jardinii* has the crown markings in the form of definite spots, while in *brasilianum* these markings are streaks. In rufous phase however both groups are streaked. Occasional birds in both groups have crown markings re-

duced or absent. The darker colored *jardinii*, both in the typical form of South America and the northern race of Costa Rica and Panamá, from present scanty data appears to range at higher elevations in the mountains than the others. Until more information is available I prefer to treat *jardinii* as a separate species.

GLAUCIDIUM BRASILIANUM RIDGWAYI Sharpe:
Ferruginous Pygmy Owl; Cocalito

FIGURE 27

Glauclidium ridgwayi Sharpe, Ibis, ser. 3, vol. 5, January 1875, p. 55. (Mérida, Yucatán.)

A small owl, without feather horns; crown streaked with buffy white; tail with 5 or 6 light bars.

Description.—Length 145-170 mm. Two color phases, grayish brown, and rufescent. Grayish brown phase: adult (sexes alike), above dark grayish brown; crown and hindneck with narrow longitudinal shaft lines of buff; a narrow, partly concealed white band across base of hindneck, with a black spot at either end; scapulars and wing coverts with irregular spots and bars, partly concealed, of white and cinnamon-buff; outer web of primaries spotted with white and buff; tips of secondaries barred with dull cinnamon-buff; tail fuscous-black or cinnamon-brown with 5 or 6 bars of white edged with buff; lores and superciliary white; side of head dark grayish brown; throat and side of lower jaw white; an indistinct band of dark brown mixed with black across foreneck; rest of lower surface white, heavily striped on sides with warm brown; legs white to buff, mottled with grayish brown; under wing coverts white to buffy white, blotched with black and dark grayish brown; underside of wing dark dull gray, banded with white and grayish white.

Rufous phase: adult (sexes alike), entire upper surface cinnamon-rufous to russet, with the paler streaks and bars deeper buff; lower surface streaked with cinnamon-rufous.

Immature, in both phases, with streaks on crown and hindneck absent, or restricted to a few marks on the forehead.

An adult male in grayish brown phase, and an adult female in rufescent phase, taken at Guánico Arriba, Los Santos, January 28, 1962, had the iris bright yellow; bill, including gape and cere, light greenish yellow, brighter green on the sides; bare area across center of upper eyelid dull green; toes honey yellow, with the pads on the underside yellow; claws black.

A fully grown immature male, with head and hindneck plain except for a few indistinct streaks on the forehead, collected at Soná, Veraguas, May 21, 1953, had the iris light yellow; tip of bill honey yellow; rest of bill and cere light greenish gray; toes dull greenish gray, with the underside yellowish; claws black.



FIGURE 27.—Ferruginous pygmy owl, cocalito, *Glaucidium brasilianum ridgwayi*.

Measurements.—Males (8 from Panamá), wing 86.0-93.4 (88.5), tail 52.9-55.5 (54.2), culmen from cere 10.0-11.0 (10.5), tarsus 20.4-22.4 (21.2) mm.

Females (4 from Panamá), wing 92.9-95.0 (93.6), tail 55.2-59.0 (57.2), culmen from cere 10.9-11.7 (11.3), tarsus 23.0-23.8 (23.3) mm.

Resident. Found in the Tropical Zone of the Pacific slope from Veraguas through western Province of Panamá. Recorded from

Veraguas (Soná, Calobre); Herrera (Parita, El Rincón); Los Santos (Los Santos, Guánico Arriba); western Province of Panamá (Playa Coronado, Bejuco).

A record for Santa Fé, Veraguas, is based on an ancient report by Salvin (Proc. Zool. Soc. London, 1867, p. 158) of a specimen now in the British Museum, taken one hundred years ago by Enrique Arcé. Arcé's specimens in most instances do not bear his original labels. Instead they have been marked by Salvin or others, with localities presumably taken from correspondence with the collector. With the present species it does not seem probable that the owl was secured above the Tropical Zone, since that is its known range elsewhere. The population of *ridgwayi* found in Panamá, from present information, appears to be isolated, since these birds have not been found in Chiriquí, or on the Pacific slope of southwestern Costa Rica, south of the Golfo de Nicoya.

These small owls are heard frequently in the limited areas in which they range, at times during the night, and regularly throughout the day. The call is given with a slight pause after the first note, followed by a slow repetition of the same sound three to six times. The low, whistled tone is easily imitated and the bird often responds. They are active in daytime, regardless of the height of the sun. Occasionally my whistle has caused them to come out on open perches to look about, perhaps through some reaction in guarding territory. Usually they show little fear, even when close at hand, though they may be resting on open branches. Their calling often attracts vireos, small flycatchers, and other birds that flutter about and scold. On one such occasion the owl paid no attention to them, but pitched at something in the grass below, an insect or a lizard, and then flew away. The stomach in most of those I have taken has been empty. Two had eaten large cicadas.

The black spots at the back of the head, a common marking in pygmy owls, resemble eyes, so that in many places they are called *cuatro ojos*—four eyes. In Costa Rica this species is known as the *mochuelo*.

SPEOTYTO CUNICULARIA HYPUGAEA (Bonaparte):
Burrowing Owl; Buhito de Hoyo

Strix hypugaea Bonaparte, Amer. Orn., vol. 1, 1825, p. 72. (Plains of the Platte River.)

A small owl without feather horns that lives on the ground in open prairie lands; legs long and slender.

Description.—Length 200-250 mm. Tarsus feathered in front, side and toes in part with slender hairlike filaments. Adult (sexes alike), above grayish brown, streaked on the crown, and irregularly spotted elsewhere, with white to buffy white; forehead white; light spots larger on the wing coverts; primaries and secondaries barred heavily with white to buffy white; tail barred with white or buffy white, with the pale markings bordered with slaty gray; superciliary white; side of head mixed dull buff and brownish black; under surface white, with a double bar of brownish black across the chest, and irregular bars of warm brown on the sides and breast; under wing coverts buffy white, the under greater coverts tipped with dark gray.

Iris yellow.

Measurements.—(From Ridgway, U.S. Nat. Mus. Bull. 50, pt. 6, 1914, pp. 815-816). Males, wing 164.5-178 (172.3), tail 74.5-86 (81.6), culmen from cere 13-15 (14.2), tarsus 41.5-48.5 (45.3) mm.

Females, wing 162.5-181 (170.3), tail 71.5-85.5 (79), culmen from cere 13-15 (13.9), tarsus 40-46.5 (43) mm.

Migrant from the north, of casual occurrence: one record from Chiriquí.

The burrowing owl, of wide distribution on the plains and other open lands of western North America, leaves the northern part of its breeding range in winter, when some move south to México and northern Central America. Stragglers reach western Costa Rica, and there is 1 record in Panamá of a female taken by W. W. Brown, Jr., at Divalá, Chiriquí, December 13, 1900 (specimen in the Museum of Comparative Zoology).

These birds live on the ground in open pasturelands and savannas where they shelter in any available hole. A hummock, stone, low bush, or fence post is a usual lookout point.

CICCABA VIRGATA (Cassin): Mottled Owl; Buho Montañés

FIGURE 28

An owl of medium size, without feather horns; varying in color pattern from pale to dark buff and brown.

Description.—Length 290-330 mm. With light and dark color phases. Adult (sexes alike), dark phase: upper surface olive-brown, barred narrowly, and spotted irregularly, with pale cinnamon-buff to produce a mottled appearance; scapulars with broad, partly concealed spots of white, and bars of light cinnamon-buff; wings fuscous-

black, with indistinct bars of buffy white; tail fuscous, with narrow bars and tip of white, mottled with grayish brown; bristly feathers at base of bill dull white mixed with black; facial disk dull buff mottled with black; an indefinite superciliary line of white, with the feathers dull buff at base and shaft lines of dull black; foreneck and upper breast buff, with broad irregular shaft lines of brownish black, and scattered edgings of buffy white; rest of under surface, including the legs, deep buff; sides and lower breast with broad shaft lines of brownish black and dark brown, bordered with white to buffy white; legs spotted and barred very narrowly with buffy brown; under wing coverts buff, marked heavily with brownish black.

Light phase: above grayish brown, below buffy white to white, with markings similar to those of the dark phase, but paler.

Juvenile, covered heavily with long, downy feathers, buff in color.

The mottled owl is distributed throughout the Isthmus wherever there is sufficient forest cover, from sea level through the Subtropical Zone. It may occur in pairs, but usually singly, as they seem to require a considerable area for feeding range. In daytime they rest in dense cover, often in the shelter of tangles of vines. They remain well hidden, and so are seldom seen. At night their abrupt calls are heard, *bru bru*, or *bu bu bu*, a single note repeated two or three times, with a pause of a second or a little more between each sound.

Stomachs of those that I have collected usually have held remains of orthoptera and beetles of large size. One taken near Armila, San Blas, had eaten a small snake. The stomach of another from Cerro Tacarcuna held a salamander.

In young birds the wings and tail grow while the body remains covered with down. Some at least leave the nest in this downy stage as soon as they have any power of flight. Juvenile individuals taken March 11, 1959, on the Río Paya, Darién, and March 13, 1948, near Pesé, Herrera, may indicate nesting during the dry season.

Their dark eyes give no reflection to lights during night hunting, so that this owl is found seldom during such excursions. It is rare also to encounter one during the day. Most of those I have handled in recent years have been taken in mist nets set at night.

Alden Miller (Condor, 1963, pp. 440-441) in studies of the syrinx in owls has found that the present species has the bronchial sound box considerably enlarged and elongated, so that it equals in size that of much larger species of the family. The vibratile membrane is equal

to that of the spotted owl, *Strix occidentalis*, which has a weight about double that of the mottled owl.

In Costa Rica this owl is called *olopopo* (a name applied also to the spectacled owl).

Two races separated by depth in color are known from the Isthmus.



FIGURE 28.—Mottled owl, buho montaños, *Ciccaba virgata*.

CICCABA VIRGATA CENTRALIS Griscom

Ciccaba virgata centralis Griscom, Bull. Mus. Comp. Zoöl., vol. 69, April 1929, p. 159. (Chivela, Oaxaca, México.)

Characters.—Coloration paler in both light and dark phases; more grayish brown above; the light phase whiter on the breast and abdomen.

Measurements.—Males (9 from Costa Rica and western Panamá), wing 208-226 (218.8), tail 115.7-131.0 (123.2), culmen from cere 17.3-19.7 (18.3, average of 8) mm.

Females (6 from Costa Rica and western Panamá), wing 237-244 (240), tail 129.0-141.0 (136.4), culmen from cere 17.5-20.3 (19.3) mm.

Resident. Fairly common in the Tropical and Subtropical Zones from the Costa Rican boundary east to eastern Veraguas and the Azuero Peninsula.

Records are as follows: Chiriquí (Santa Clara, El Volcán, Buena Vista, Bugaba, Lérída, Quiel, Boquete); Veraguas (Calovévora, Calobre, Chitra); Herrera (Pesé); Bocas del Toro (Almirante, Cricamola).

It is probable that this owl may range more widely in the western provinces but to date there are no other records. Though usually a forest bird, near Pesé I found a pair in a dense thicket covering the steep slopes of the Quebrada Tejel.

This race of the mottled owl, sometimes known as the wood owl, ranges north to southern México.

CICCABA VIRGATA VIRGATA (Cassin)

Syrnium virgatum Cassin, Proc. Acad. Nat. Sci. Philadelphia, vol. 4, 1848, (1850), p. 124. (Bogotá, Colombia.)

Syrnium lineatum Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1862, p. 462. (Atlantic Slope along the Panama Railroad, Canal Zone, Panamá.)

Characters.—Definitely darker in both color phases; deeper brown on the dorsal surface, and definitely buff colored below.

Some individuals in dark phase are very black, so much so, that viewed alone they appear almost as a distinct form.

A male taken on the slopes of Cerro Pirre, Darién, February 2, 1961, had the iris warm brown; bill greenish yellow; toes light mouse brown; claws gray, with darker tips of dusky neutral gray.

Measurements.—Males (11 from the Canal Zone, Darién, and San Blas), wing 217-229 (223.5), tail 116.3-132.3 (125.8), culmen from cere 17.4-19.8 (18.6) mm.

Females (9 from Canal Zone, Darién, San Blas, and northwestern Colombia), wing 225-237 (233.7), tail 126.4-138.0 (132.4), culmen from cere 19.3-22.0 (20.3) mm.

Resident. Fairly common in Tropical and Subtropical Zone forests from the Canal Zone east to the Colombian boundary.

Records are as follows: Canal Zone (Barro Colorado Island, Rodman Navy Base, Juan Mina); Darién (to 600 meters elevation on Cerro Pirre, Boca de Cupe and Boca de Paya on the Río Tuira, mouth of the Río Tuquesa on the Río Chucunaque, Upper Río Tacarcuna, to 1,450 meters on Cerro Malí, and to 1,250 meters on Cerro Tacarcuna); San Blas (Mandinga, Armila).

It seems certain that these owls are found also in the forests of the Cerro Azul in the eastern sector of the Province of Panamá, as I have recorded them in the foothills of this range above the Río Cangandí, near Mandinga on the San Blas side.

I have seen them during the day near Juan Mina in a palm tree standing in heavy forest, and in the Darién jungle in dense stands of bamboo.

At Mandinga the Cuna Indians called them *su le pa*.

Belcher and Smooker (Ibis, 1936, p. 18) describe a set of 2 eggs of this race, collected on the island of Trinidad, as "roundish ovals, dull white, with slightly rough surface." The 2 eggs in another set were "more regular ovals." The range of measurements is given as 38-40.6 × 31.5-32.5 mm. One set came from a tree nest that appeared to be an old structure made by some other bird. The other was from a hole in a tree.

The population of Panamá is at the northwestern extension of this race, which ranges across Colombia and northern Venezuela to Trinidad.

CICCABA NIGROLINEATA Sclater: Black-and-White Owl;
Buho Blanquinegro

Ciccaba nigrolineata P. L. Sclater, Proc. Zool. Soc. London, August 31, 1859, p. 131. (Oaxaca, México.)

Slightly larger than the mottled owl, and like that species without feather horns; black above, white barred heavily with black on lower surface.

Description.—Length 365-395 mm. Adult (sexes alike), above sooty black, with narrow white bars that form a collar across the hind-neck, and a narrow band across the rump; primaries and secondaries with a few indistinct narrow bars of white and grayish brown on the outer webs; greater and primary wing coverts faintly mottled with dull grayish brown; tail with tip and narrow cross bands of white; face black, in some plain, in others spotted sparingly with white; a series of white spots forming a superciliary line; throat black; under surface, including under wing coverts, white, banded narrowly with black; feathered legs black barred with white; under surface of primaries and secondaries banded prominently with white.

Juvenile, white above and below, barred with sooty brown.

A male taken at La Jagua, Panamá, January 12, 1962, had the iris dark orange-brown; bill bright yellow; cere orange-yellow; toes

bright yellow; base of claws honey yellow, shading to dull neutral gray at the tip.

A female collected February 23, 1960, at Palo Santo, near El Volcán, Chiriquí, had the iris light yellowish brown.

Measurements.—Males (6 from Panamá and Colombia), wing 254-268 (261.6), tail 144-165 (152.3), culmen from cere 19.0-21.1 (20.0, average of 5) mm.

Females (9 from México, Honduras, Panamá, and Colombia), wing 270-279 (275.2), tail 160-178 (170.2), culmen from cere 19.5-22.8 (21.6) mm.

Resident. Rare in forests of the Tropical and lower Subtropical Zone. Recorded from Chiriquí (Divalá, El Volcán, Quiel); Veraguas (Chitra, El Villano); Bocas del Toro (Cayo Agua); Canal Zone (Gatun, Tiger Hill, Barro Colorado Island), and eastern Province of Panamá (La Jagua).

This is an owl of wide distribution from southern México through Central America and northwestern South America, but one that is little known aside from the specimens in museums.

In the Canal Zone Hallinan secured 2 in 1909, 1 near Gatun February 11, and another at Tiger Hill February 20. He reported that the bird gave a catlike call. In 1952, on Barro Colorado Island, Lloyd Ingles heard a curious sound, a loud *whee-u-u-u* that first he supposed came from an ocelot or some other nocturnal mammal, but that he traced to an owl. His photograph of it showed unmistakably the present species. He and Mrs. Ingles heard them calling subsequently, and once saw one alight in the grass in front of one of the buildings, apparently to catch some small prey. On March 2 and 3, 1956, I saw one at dawn in a papaya tree below the laboratory. Here, on the second occasion, the owl remained until there was sufficient light for me to see the barred markings clearly. The bird rested unafraid while two of the island workers walked up the steps near it, and only flew off into the woods at full light. On the following night, and again on April 2, 1957, repeatedly I heard the drawn-out call described by Dr. Ingles. The sound suggested a barn owl, but was shorter and less harsh in tone. Mrs. Harriet Burkhart has given me an interesting observation made in February 1957, in which one of these owls rested on a porch railing, and in an orange tree. The bird was hunting small black bats, *Myotis nigricans*, that hung on high screens about the houses.

At La Jagua on the evening of January 12, 1962, Baldomiro and I heard an owl call from the trees fringing the marsh, an abrupt explo-

sive *bu*, repeated at short intervals, occasionally with a faint suggestion of a brief second syllable. As this differed only slightly in tone from the call of the mottled owl, I was surprised when we traced it down to find that the author was the present species. This bird thus utters two quite different sounds.

It has a deep red eye shine in the light of an electric torch, a color that is definite with the bird near at hand but one that is not seen far.

The stomach of 1 shot at Palo Santo, Chiriquí, February 23, 1960, held parts of a mouse and fragments of large insects. The 1 taken at La Jagua contained the rear portion of a small, long-tailed mouse, and the remains of a small bat. Tashian (Auk, 1952, p. 62) found parts of large insects and a bat in stomachs of 2 collected near Palenque, Chiapas.

Some individuals of the black-and-white owl from Colombia have the back marked with prominent white bars in varying amount, a peculiarity that was recognized by Sharpe (Cat. Birds Brit. Mus., vol. 2, 1875, p. 277) as a distinct race that he called *Syrnium spiloneotum*, as he placed *nigrolineata* in the genus *Syrnium*. The character is highly variable in extent, so much so that usually it is considered an individual variation. Possibly the marking is due to casual persistence of the juvenile pattern. Blake (Fieldiana: Zool., vol. 36, 1958, p. 514) has used this variation to unite *Ciccaba nigrolineata* and *Ciccaba huhula*, found from southeastern Colombia and southern Venezuela south into Brazil, as geographic races of one species. There is no question as to close relationship, but the southern group (*huhula*) is so black, with this color predominating in the pattern, with the white reduced to very narrow lines above, and the white bars below narrower than the black ones, that it appears to me preferable to regard the two as a superspecies that embraces two distinct entities, each with a specific name.

RHINOPTYNX CLAMATOR FORBESI Lowery and Dalquest:
Striped Owl; Buho Listado

FIGURE 29

Rhinoptynx clamator forbesi G. H. Lowery, Jr., and W. W. Dalquest, Univ. Kans. Publ. Mus. Nat. Hist., vol. 3, no. 4, October 10, 1951, p. 576. (Presidio, Veracruz, México.)

A horned owl of medium size; buff to buffy white, heavily striped with black.

Description.—Length 340-365 mm. Adult (sexes alike), above light buff to cinnamon-buff, heavily streaked with brownish black, with

many irregular crossbars of the same color; long, prominent horns black with inner margin deep buff; scapulars edged broadly with white; greater wing coverts edged broadly with white and light buff; outer primaries buff, barred narrowly with brownish black; inner primaries and secondaries dull buff to grayish buff, mottled with gray and dull black; outer tail feathers buff, barred with brownish black; central pairs similar but mottled with gray to brownish black; face white to buffy white, with a prominent black facial rim, usually with some mixture of buff, and indistinct shaft lines of black; entire under



FIGURE 29.—Striped owl, buho listado, *Rhinoptynx clamator forbesi*.

surface white to buff, the buff varying in depth, heavily striped with brownish black, the stripes bordered more or less with deep buff; black stripes usually shorter and broader across the chest to form an indefinite cross band; under wing coverts and entire anterior margin of forewing white to buff, the under surface lined or spotted lightly with dull black.

Juvenile, face cinnamon, with the basal rim in 3 concentric color bands, the inner one white, the central one black, and the outer deep buff; crown buffy white, with a few narrow lines of black; under surface, including the tarsi, dull buff, with a few indistinct, broken cross bands of dull gray.

Male and female, taken on the Quebrada Carriaso, on the southern slope of the Cerro Azul, April 25, 1949, had the iris hazel; bill black; cere neutral gray; claws black.

A female shot at Soná, Veraguas, May 28, 1953, had the iris light cinnamon-brown, exactly the same shade as the feathers of the crown.

Measurements.—Males (6 from Panamá, Costa Rica, and Veracruz) wing 223.0-236.0 (229.5), tail 119.1-131.5 (125.7), culmen from cere 19.5-23.2 (21.2) mm.

Females (7 from Panamá and Guatemala), wing 228-242 (235.0), tail 121.4-134.2 (126.4), culmen from cere 20.7-22.7 (21.7) mm.

Resident. Local, in the lowlands of the Pacific slope. Recorded from Chiriquí (locality uncertain), Veraguas (Soná); Herrera (Parrita, Santa María); Canal Zone (Ancon, Balboa, Paraiso) and eastern Panamá (Pacific side of Cerro Azul); to the lower Chagres Valley on the Caribbean side (Juan Mina).

These interesting owls are found in open areas of grass and marshland, where thickets and low trees offer shelter at need. They rest regularly in low trees, but nest on the ground. When seen clearly the long feather horns are prominent, as is the distinctly buff plumage. At Juan Mina I have seen them at sunset flying low over marshes, quartering the broad expanses of grasses and other floating vegetation. In other areas I found them resting during the day on low perches, sometimes in lines of trees that separate open fields. Small birds gather to scold them, so it appears that they are definitely predatory. I have never identified a nocturnal call of this owl.

At Juan Mina, Canal Zone, Enrique van Horn showed me a nest on December 17, 1955, placed on the ground in an open space in a citrus grove. The location was on a slightly elevated section where grass and weedy plants grew to a height of more than a meter. The 2 white eggs were placed on flattened plant growth, with no semblance of a formal nest depression, but were overhung by the surrounding herbage to give a measure of seclusion. A parent bird flushed from the nest, and perched in a nearby tree to watch as I took several photographs and packed the eggs for removal. The nest area was so well located that it was dry in spite of a tremendous rain the previous night that had left standing water in all depressions. The site appears to be one that these owls use regularly as Dr. F. A. Hartman (Condor, 1956, p. 73, fig. 1) recorded 2 young in down on January 8, 1953, and on January 5, 1962, van Horn found there 2 young, old enough to sit erect in the nest.

One of the 2 eggs collected was fresh. In the other incubation had

begun. As stated, they are white, but slightly nest-stained, with the shell somewhat roughened. In form both are well-rounded elliptical. They measure 43.7×37.4 and 43.7×37.8 mm.

The range outlined is based on my personal observations, and on specimens examined. The Rothschild collection in the American Museum of Natural History has 2 skins from Chiriquí purchased from the dealer Rosenberg, a male labeled "Volcan, 9,000 feet, Sept. 20, 1904," and a female marked "Boquete, 3,500 feet, Oct. 17, 1904." From the date it is probable that they were collected by Watson, possibly lower down than stated, perhaps at Francés, since the species elsewhere is one of the lowlands. The record by Festa (Salvadori and Festa, Bol. Mus. Anat. Comp. Torino, vol. 14, 1899, p. 10) for a specimen of this owl from Colón is certainly an error. On his expedition to Panamá and Ecuador Festa numbered his specimens in sequence. He arrived in Colón May 27, 1895, but remained there only briefly. In his list he mentions 2 skins of the blue-black seedeater from Colón with catalog numbers 9 and 10. He states that in addition to his own collections, while in Panamá (i. e., in Panamá City) he secured some skins from Chiriquí prepared by the well-known collector Arcé. In regard to these he adds "pochi-sono gli uccelli di Colón," obviously in error as Arcé is not known to have collected there. The owl listed with the number 174 is in the series of numbers for the Arcé material, with number 173 and 175 both indicated from "Chiriquí."

AEGOLIUS RIDGWAYI RIDGWAYI (Alfaro):

Central American Saw-whet Owl; Buhito Moreno

Cryptoglaux ridgwayi Alfaro, Proc. Biol. Soc. Washington, vol. 18, October 17, 1905, p. 217. (Candelaria Mountains, near Escasú = Cerros de Candelaria, near Escasú, Costa Rica.)

Small, without feather horns; plain dark brown above, buff below, without streaks or bars.

Description.—Length 185-190 mm. Adult (sexes alike), crown, back, greater and middle wing coverts dark brown; wing and tail dark grayish brown; a slight edge of white on alula, and a more restricted line of the same color on the outer margin of the three outermost primaries; bristly feathers in front of eye black; forehead and a narrow line above eye white (partly concealed); cheeks brown like crown, with the feathers white basally; under surface, including feathered tarsus, buff, with an indefinite band of cinnamon-buff across breast; toes white, feathered to proximal base of outermost segment;

edge of wing buffy white; under wing coverts dull cinnamon-buff; inner webs of secondaries spotted with white.

Measurements.—Males (2 from Costa Rica and Panamá) wing 138.0, 138.8; tail 66.1, 67.7; culmen from cere 11.8, 12.3; tarsus 25.9, 26.5 mm.

Female (1 from Costa Rica), wing 152.0, tail 70.5, culmen from cere 13.8, tarsus 29.8 mm.

Rare. Known in Panamá from 1 specimen, from 2,280 meters elevation on the western face of El Barú, Chiriquí.

This single record, a male, was taken in a mist net on February 17, 1965, by E. Tyson.

Marshall (Condor, 1954, pp. 24-27), in observations in the mountains of El Salvador, describes the call of *Aegolius ridgwayi* as "a series of ten mellow whistles, each note distinct, but not staccato. . . much softer than the whistle of *Glaucidium brasilianum*." He observed further that the notes in sound were like those of the northern saw-whet owl, "but were always at a constant pitch." He found a feather in the stomach of one, and a few hairs in another.

Specific status, and subspecies to be recognized, in this group of owls is uncertain because of the few specimens available. Pending further data the bird of Panamá is treated with that of Costa Rica under the name *Aegolius ridgwayi ridgwayi*.

The type of *ridgwayi*, a male in the U. S. National Museum, from Costa Rica, with the locality Escazú, in the mountains to the west and southwest of San José, and a female in the American Museum of Natural History from Volcán Irazú in that country, are somewhat warmer, brighter brown throughout than the specimen from Chiriquí, but are similar in pattern of coloration, including the restricted markings on the wing. While Alfaro's original description of the type states "toes (except basal half of the outer) naked" it appears that originally they were feathered lightly to beyond the base of the outer joint, as is the condition in the recently taken specimen from Chiriquí. In examination of Alfaro's type under low magnification I note a hint of a few feather papillae along the margin of the area that now is bare.

The specimen from Volcán Barú in Panamá adds one more to the small number of these owls known from the mountain areas of Central America. Like the others, in plumage pattern it resembles the immature stage of the northern *Aegolius acadicus*, from which it differs in absence of light markings on wings and tail. The type specimen of *Aegolius ridgwayi rostrata* (Griscom) from Guatemala is slightly

lighter, brighter brown, and has the toes somewhat more extensively feathered. *A. r. tacanensis* Moore from Chiapas, known only from the type specimen, is said to differ in short, buffy streaks on the forehead. Another form, based on a single specimen taken in Oaxaca, has been named *Aegolius acadicus brodkorbi* by Marjory A. Brooks (Proc. Biol. Soc. Washington, vol. 67, 1954, p. 180). This resembles those known from farther south, but has light markings, restricted in extent, on the primaries and the tail. In this it shows approach to the immature stage of *acadicus*. Miss Brooks, in connection with her description, points out a similarity in these birds in their apparent retention through life of a plumage stage found only in the immature of the generally similar populations of the north to a condition found in certain salamanders. These regularly reproduce in a stage similar to the larval form of related kinds. Some of them on occasion may develop adult body form, a change that may be instigated artificially through thyroid stimulation. Her interesting suggestion is that persistence among saw-whet owls resident in the south of a plumage similar to that of the immature in the birds of the north may represent a neotenic stage similar to that of the salamanders. On this reasoning she regards all of the owls under discussion as races of *Aegolius acadicus*.

Order CAPRIMULGIFORMES

Family STEATORNITHIDAE: Oilbirds; Guácharos

The one peculiar species of this family, while grouped in an order with the typical goatsuckers, is so different in its anatomy that it is segregated in a separate suborder Steatornithes. The large, strong bill, with its elongated, curved tip, and toothed margin on the maxilla, and the firm body plumage are striking external differences from the related families of the order. Equally striking is the manner of life in which the oilbird nests in colonies in the shelter of caverns. Where these are dark, the birds in flight are guided by a system of acoustic orientation in which they produce sharp, clicking sounds. The slender vibrissae that project forward from the base of the maxilla perhaps may serve some tactile sense. This is suggested as the longer ones, 10 to 12 in number on either side, measuring 50 mm. or slightly more when complete, often are shorter so that they seem subject to abrasive wear.

STEATORNIS CARIPENSIS Humboldt: Oilbird, Guácharo

FIGURE 30

Steatornis caripensis Humboldt, Bull. Sci. Soc. Philom. Paris, 1817, p. 52.
(Caverns of Caripe, Monagas, Venezuela.)

Body form of a large goatsucker, but with powerful bill; rusty brown, spotted with white on under surface, wings and head.

Description.—Length 410-460 mm. Adult male, above rusty brown, paler, more buffy on secondaries and inner primaries, which, with their coverts, are barred and faintly mottled with dull slate; tail with narrow bars and numerous dots of sooty black; lower surface, including under wing coverts, pale rusty; under surface, crown, and middle wing coverts spotted with white, each spot bordered narrowly with sooty black; outer primaries and outer tail feathers spotted with white on outer webs; edge of wing white.

Adult female somewhat paler and more rufous.

Immature, sooty brown on crown, back, and rump; wings and tail dark brown, except the uppermost lesser coverts, which are rusty, edged with white; darker, slaty brown below; spotted with white as in adult.

Iris dull yellow; bill light reddish brown; tarsi and feet light reddish brown.

Measurements.—Males (10 from Ecuador and Trinidad), wing

285-335 (306.6), tail 181-207 (195.6), culmen from base 31.4-36.1 (33.8), tarsus 17.5-20.0 (18.6) mm.

Females (10 from Darién, Ecuador, Perú, Venezuela, and Trinidad), wing 286-313 (300.6), tail 176-201 (189.0), culmen from base 30.1-33.4 (32.0), tarsus 17.4-20.0 (18.8) mm.

Wing and tail are subject to much abrasion from the rough ledges of the caverns in which these birds live.



FIGURE 30.—Oilbird, guácharo, *Steatornis caripensis*.

Status uncertain. Known in Darién from a single specimen.

During the night of March 19, 1959, Bernard Feinstein caught a guácharo in a mist net set for bats across the Río Tacarcuna at 580 meters elevation on the approach to Cerro Malí, Darién. This specimen, preserved at the time in formaldehyde and prepared as a skin at the U. S. National Museum a few months later, is a male, an individual fully grown, but evidently in its first year, from the color of the tail. The primaries are slightly worn at the tip, so that the bird had been for some time on the wing.

As the species is recorded from western Colombia it may have come from that area.

Oilbirds are reported to eat the fruits of several palms, and also of species of the families Lauraceae, Burseraceae, and Araliaceae. They nest in groups in caves, and return to rest in such sheltered quarters,

though at times they have been recorded roosting in the open. As most of the fruits eaten are aromatic, Snow (Zool., vol. 47, pt. 4, 1962, p. 217) believes that the bird in its search for food may be guided by an olfactory sense.

Family NYCTIBIIDAE: Potoos; Leonas y Urutaús

The species of this family differ from the related nighthawks and typical goatsuckers in much larger size, and also in their daytime pose, in which they rest on the end of a small stub, or on a knob projecting from a large branch or tree trunk. Here they sit motionless with the tail hanging straight down, the bill pointing up, and the lids covering the large eyes closed to a barely perceptible slit. With their mottled gray and brown pattern they mimic so perfectly the wood that they seem a part of it. Because of their large size persons not familiar with birds in detail usually class them as owls. Anatomically, they differ externally from the true goatsuckers in the presence of prominent powder down patches, a sharply angular projection on the side of the maxilla, lack of a pecten or comb on the middle claw, and a very short tarsus, only half as long as the inner toe.

The five species are confined to the warmer lowlands of the Americas. Two range in Panamá.

KEY TO THE SPECIES OF NYCTIBIIDAE

Size very large; wing 345 to 382 mm., tail 219 to 265 mm.; lesser wing coverts black, mottled with brown....Great potoo, *Nyctibius grandis grandis*, p. 188
Size smaller; wing 264 to 282 mm., tail 174 to 196 mm.; lesser wing coverts plain black.....Lesser potoo, *Nyctibius griseus panamensis*, p. 191

**NYCTIBIUS GRANDIS GRANDIS (Gmelin): Great Potoo;
Leona**

Caprimulgus grandis Gmelin, Syst. Nat., vol. 1, pt. 2, 1789, p. 1029. (Cayenne.)

A nocturnal bird, goatsuckerlike in form of body and head, equal in size to the larger owls.

Description.—Length 450-510 mm. Two color phases, one grayer, the other washed more or less heavily with buffy brown. Adult (sexes alike), above with the ground color mixed gray, or buffy brown and white in varying amount, barred lightly or heavily, and mottled with gray, fuscous and sooty brown; outer wing coverts sooty black, lined with brown; primaries and secondaries black, barred indistinctly with dull gray, with the outer webs marked heavily with

white to grayish white; tail barred heavily with white and dull black, mottled throughout with buff and dull gray; throat and foreneck pale buff to cinnamon-buff, with fine, broken bars and dots of sooty black; breast and sides mixed buffy brown, buff or dull white, mottled with brown and dull black; abdomen whiter; an indefinite, broken dull black band across breast; under tail coverts white, with a few narrow sooty brown or dull brown bars; under wing coverts blackish slate, barred with white.

Juvenile, paler throughout, decidedly whiter on head, back, breast and sides, with the barring and mottling of darker colors much reduced.

A female recorded by Festa (Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 14, 1899, p. 8), taken at Punta de Sabana, Darién, August 1, 1895, had the iris dark chestnut; bill brown, paler on the commissure, darker at the tip; tarsus and toes yellow.

Measurements.—Males (22 from Nicaragua, Panamá, Colombia, Ecuador, Perú, Venezuela, Guyana, Dutch Guiana, and Brazil), wing 342-382 (364.5), tail 219-256 (235.2), culmen from base 26.5-37.0 (33.2, average of 20), tarsus 16.4-20.5 (18.0) mm.

Females (14 from Colombia, Ecuador, Perú, Venezuela, Guayana, Dutch Guiana, and Brazil), wing 347-380 (362.3), tail 227-265 (239.5), culmen from base 30.8-37.4 (33.2), tarsus 16.5-21.0 (18.0) mm.

Resident. Rare; recorded from Bocas del Toro (Cricamola); Canal Zone (Barro Colorado Island, Lion Hill); eastern Province of Panamá (Frijolito); Darién (Punta de Sabana, Río Capetí, Río Jaqué); San Blas (Mandinga, Armila).

The little known of this species in the Republic at present is summarized in the range above. The few specimens on record include a male from Cricamola, taken in April 1937, by H. von Wedel (in the Department of Zoology, University of California at Los Angeles), 1 (sex not known) taken by McLeannan at Lion Hill, Canal Zone (in the American Museum of Natural History), a female secured by Festa, at Punta de Sabana, Darién, August 1, 1895 (in Instituto e Museo de Zoologia, University of Torino), and 1 prepared by W. B. Richardson on the Río Capetí, Darién, on May 26, 1915. In April 1947, at our camp where the Río Imamadó joins the Río Jaqué I heard the harsh calls of these birds on several occasions. The Chocó Indians here knew them, but in night hunting I was not able to secure one. I believed that I saw their eye shine from the high forest crown in the tallest trees, but was never certain. They were reported in February

1957, at Mandinga, San Blas. In early January 1962, with Enrique van Horn and José Mena I went in from Río Duque, located north of the bridge across the Río Chagres on the Trans-Isthmian Highway, to the region called Frijolito, on the headwaters of the Río Frijolito, where Van Horn had seen them. In two nights here we heard the birds calling briefly, but did not succeed in finding one. Later this same season on March 1, at a camp in a locality called Tigre, at 475 meters elevation at the head of the Río Guabal, on the Caribbean slope of northern Coclé I heard one at night. A later record was for March 13, 1963, at Quebrada Venado, in eastern San Blas, when I was awakened by one calling from a huge tree standing in a clearing. I went over there quietly, but though the bird continued its call at intervals until daylight it remained so concealed in the high tree crown that I could not locate it. Finally at the first hint of light it flew across to the forest.

The voice is a harsh, uncouth grating sound, *wah-h-h oo-oo-oo*, strongly guttural. It is from this call, wholly unbirdlike, that it is known as *leona*. The superstitious sometimes believe that it is the voice of a witch.

In observations in Surinam, Haverschmidt (Auk, 1948, pp. 31-32) found that a great potoo had a regular perch during the day on a branch in the top of a tall tree grown for shade over a coffee plantation. At night also it frequented definite perches from which it had clear view. From these it made regular flights, evidently to capture flying insects. One shot by soldiers November 24, 1946, fell with an egg, which was broken. This bird, an adult female, weighed 581 grams.

Helmut Sick (Vogelwelt, 1951, pp. 42-43) on July 5, 1949, in the Xingú area of Mato Grosso found the resting place of 1 that he observed for several days. In the absence of the bird on July 19 an egg was visible which rested securely in a slight depression on a horizontal branch, 12 meters from the ground. The shell was white without gloss, marked with spots of dark brown varied to lilac-gray, which ranged in size from small to 3 mm. in diameter. These spots were most abundant on the larger end of the egg. The egg, shown in a photograph to be elliptical in form, measured 52.1×38.3 mm.

Recently Land and Schultz (Auk, 1963, p. 195) have extended the range of this strange bird to eastern Guatemala and on the basis of 2 specimens have described *Nyctibius grandis guatemalensis*, with the type locality near Panzós, Alta Verapaz, Guatemala. The 2 specimens, the type female, and the other taken on Río Salinas, Petén (sex not known), are said to differ from typical *grandis* in being larger,

browner, less gray, with reduced vermiculation of dusky on the back, and the sides of the crown extensively white, flecked with dusky, forming a broad band above each eye. The measurements of 402 mm. in the wing of both, and of 277 and 282 in the tail indicate the large size.

The typical race ranges from Lake Nicaragua, Nicaragua (specimen in British Museum taken March 24, 1896) and from Panamá through South America to Perú and southern Brazil. The species has not been reported to date from Costa Rica.

NYCTIBIUS GRISEUS PANAMENSIS Ridgway:
Lesser Potoo; Urutaú

FIGURE 31

Nyctibius griseus panamensis Ridgway, Proc. Biol. Soc. Washington, vol. 25, May 4, 1912, p. 91. (Natá, Coclé, Panamá.)

A nocturnal species, goatsuckerlike in form, but with longer tail and wing; like the great potoo, but less than half as large.

Description.—Length 340-380 mm. Two color phases, one gray, the other much darker, blacker, more cinnamon-brown; male and female alike. Adult, gray phase, crown and hindneck sooty black, with the feathers bordered with white; back, scapulars, and rump grayish brown, streaked indefinitely with black, somewhat mottled with dusky brown, buff, and white, and spotted with black; lesser wing coverts black; middle coverts clay color and white, mottled with dusky, and streaked with black; greater coverts and primaries sooty black, spotted and barred indistinctly with grayish white; outer secondaries barred and mottled with white; tail dull black, barred indistinctly with gray and grayish white; throat white edged and mottled with black, buff and gray; upper breast brownish gray, mottled with dull white, with black shaft streaks, and a black necklace of heavy spots; lower breast, abdomen, and under tail coverts white, mottled lightly with gray and buff, with shaft streaks of buff; edge of wing white; under wing coverts blackish slate spotted with black.

Dark phase: much darker throughout, with black, dark gray, and dull cinnamon predominant; wings much blacker.

Young, heavily covered with downy feathers that are predominantly pure white with shaft lines of black above and below; a wash of pinkish buff on back and, more lightly, on lower surface; lesser wing coverts and growing quills black.

Iris yellow; bill fuscous-black, with the cutting edge, including the

toothlike projection on the maxilla, dull brown; tarsus and toes pale brown; base of claws light brownish white, tips dull black.

Measurements.—Males (15 from Panamá and Colombia), wing



FIGURE 31.—Lesser potoo, urutaú, *Nyctibius griseus panamensis*.

264-282 (271.3), tail 174-196 (182), culmen from base 24.2-29.8 (26.2), tarsus 12.0-14.8 (13.3) mm.

Females (3 from Panamá and Colombia), wing 268-282 (275), tail 178-196 (185), culmen from base 25.5-27.6 (26.4), tarsus 13.0-13.5 (13.2) mm.

Resident. Found locally in forested areas in the lowlands and lower hills through the Republic on both Caribbean and Pacific slopes. Not recorded to date from the eastern side of the Azuero Peninsula in Herrera and Los Santos.

Though widely distributed in tropical America, these curious birds are so strictly nocturnal in their activities that their presence is known mainly through their strange calls. These come from the forest at night, most regularly when there is moonlight. A common utterance is a loud note of several syllables, uttered slowly in falling cadence, that near at hand to the human ear may seem an expression of melancholy and despair, but at a distance is truly musical. The usual call is of four to six syllables, descending in scale, sounds that carry for a long distance. It is easily imitated by a whistle, when the bird may answer. Another utterance is a somewhat guttural *cwuh ca-wuh-h-h* that at a little distance suggests the call of an owl.

During the day the *urutaú* rests quietly on a shaded perch, often a knob on the vertical trunk of a tree, or the broken end of a small stub. Here it sits with the tail straight down, bill pointed up, and eyes closed to a slit, so that with its mottled colors and curious position it resembles a woody continuation of the tree trunk. It is found daily on the same chosen resting place. At nightfall it moves to a commanding outlook from which it sallies to capture insects that pass, and then returns to its perch. A favorite lookout is on a stub on the bank of a river where the bird has open view. Large beetles, orthoptera, and occasionally moths of medium size or larger are the usual prey. The open mouth, 50 mm. or more across, with short, stiff bristles projecting from the outer sides of the upper half of the bill forms a capacious scoop for these captures. The stomach walls are only slightly muscular so that it has been my supposition that the indigestible chitin of legs, wings, and body must be regurgitated in pellet form. The masses present in those that I have examined seem too large and rough to pass through the rather narrow tube of the intestine.

In night-hunting I have noted that the eyes glow deep red near at hand, orange or even yellow from afar. They show clearly at a considerable distance because of their size.

The tarsus in these birds is remarkably short, while the toes are strong. Occasionally they may perch across a small branch in the position normal to perching birds, but do not rest lengthwise of a limb in the manner usual in the true goatsuckers. In nesting the single egg is placed in a slight depression on a knob or stub, one deep enough to be secure. The bird in incubation rests in front, with the feathers of

the abdomen thrown forward over the egg. When the egg hatches the young bird remains in the same spot. So safe is this that countrymen sometimes believe that egg and young have been secured by some glue applied by the parent! R. E. Johnson (Illustrated London News, March 13, 1937, p. 436) recorded the incubation period in Trinidad as 30 days. The young bird remained in position for another 40 days. For the first 3 weeks it was covered constantly by a parent, the two alternating in this care. For the rest of the period one of the adults was with it constantly. When the young bird finally left it was strong in flight.

Muir (Ibis, 1925, p. 655) described an egg from Trinidad, of the race *Nyctibius griseus griseus*, as "dull white profusely spotted and streaked with brown with underlying markings of grey, more so at one end." This egg measured 40×25 mm. Sick (Vogelwelt, 1951, p. 42, pl. 14) describes an egg also listed as that of *Nyctibius griseus griseus*, found in Ilha Grande, Rio de Janeiro, Brazil, as without gloss, white, spotted with chocolate brown and lilac-gray, some of the markings large (3 mm. in diameter), others fine spots. The form as shown in the illustration is elliptical. This egg measured only 36.2×29.0 mm. Possibly it is of another race.

The large broad head in this species is supported by lateral expansion of the base of bone. Openings for the eyes are huge, with the mechanism of the ears, and of the support for the mandible, expanded below. The bone itself is a series of plates and struts that is strong but light. The transverse width of the open mouth may be 50 mm. The considerable lateral expansion of the skull has no relation to the brain, which is tiny compared to the great size of the bird. On one occasion in the course of preparing specimens, I noted that the cranial cavity was identical in size with that of a tiny piculet. Danforth (Auk, 1928, p. 486) gave the dimension of the brain cavity in a male collected in Jamaica, of a race larger than that of Panamá, as 12×14.5 mm.

Those who dwell near forested areas from Panamá to northern South America will assure the listener that the nocturnal song of this bird is the call of a sloth, a superstition that dates back to the writings of Oviedo. Perhaps this belief is responsible for the lack of a common name, as those who see the bird mistake it for an owl, and usually call it *lechuza*. *Urutaí*, current appellation for the species from Brazil to Argentina and Uruguay, from the Guaraní language, signifies a ghost or phantom bird. In Trinidad the bird is called *poor-me-one*.

As a species the lesser potoo is found in the Greater Antilles in Hispaniola and Jamaica, each with a well-marked race of large size.

On the mainland it ranges from southern México through Central America and South America to northern Argentina and northern Uruguay. The most northern population in México, *Nyctibius g. mexicanus*, pale in color, is of maximum size, with the wing 297-307 mm. The race *panamensis*, which is smaller, and has two color phases is found from western Panamá south through Colombia (except east of the Andes) to Ecuador and western Perú. The subspecies *costaricensis* to the north, also named by Ridgway, from comparatively few specimens seen is larger and apparently is a connecting group leading to *mexicanus*. Birds from western Chiriquí are larger than most, and appear intermediate toward *costaricensis* in size and color.

Family CAPRIMULGIDAE: Goatsuckers, Chotacabras y
Tapacamínos

The long-winged birds of this family are marked by short, weak bills, and extremely large, broad mouths that open widely and so serve to capture their food of flying insects. The plumage is soft, rather loose, with a mottled pattern of inconspicuous colors. All are night-birds, only the true nighthawks being active also by day. They are known, therefore, mainly from the curious calls of the males heard during the breeding season. The flight like that of owls is noiseless.

The family is widely spread through the warmer countries of the world, those that nest in colder regions being migratory to escape the winter period when their insect food is not available. The common countrywide Spanish name given collectively for all species of the family is *capacho*, a word of uncertain derivation in application to a bird. Another name, *tapacamino* is sometimes varied to *ataja camino*.

KEY TO THE FAMILY CAPRIMULGIDAE

1. Rictal bristles very small, barely evident..... 2
 With long, prominent rictal bristles..... 4
2. Tail truncate, central rectrices equal to the lateral pairs, or slightly longer.
 Short-tailed nighthawk, *Lurocalis semitorquatus noctivagus*, p. 196
 Tail emarginate, the central rectrices shorter than the lateral pairs..... 3
3. White wing bar located at center of wing.
 Common nighthawk, *Chordeiles minor*, p. 204
 White wing bar located nearer tip of wing.
 Lesser nighthawk, *Chordeiles acutipennis*, p. 199
4. Rictal bristles with lateral filaments toward base; larger, wing more than 200 mm..... Chuck-will's-widow, *Caprimulgus carolinensis*, p. 213
 Rictal bristles smooth, without lateral filaments at base; smaller, wing less than 190 mm..... 5

5. Tarsus bare, except at the proximal joint; tail nearly as long as wing.
 Pauraque, *Nyctidromus albicollis*, p. 208
 Tarsus feathered on front for about one-half of length; tail not more than three-fourths as long as wing..... 6
6. With a white (male) or buffy (female) band across the outer primaries; abdomen plain, without markings.
 White-tailed nightjar, *Caprimulgus cayennensis albicauda*, p. 220
 Without a white or buff band across the outer primaries..... 7
7. Without a light band on lower foreneck; inner webs of primaries black, with very few rufous markings or none.
 Dusky nightjar, *Caprimulgus saturatus*, p. 219
 With a distinct light band on lower foreneck; inner webs of primaries regularly barred with cinnamon-buff..... 8
8. Color predominantly rufescent brown and deep buff; larger, wing 170 mm. or more, usually 175-180 mm.
 Rufous nightjar, *Caprimulgus rufus minimus*, p. 215
 Color predominantly grayer, marked with black; buff colors paler; smaller, wing usually less than 165 mm.
 Whip-poor-will, *Caprimulgus vociferus vociferus*, p. 218

LUROCALIS SEMITORQUATUS NOCTIVAGUS Griswold:
 Short-tailed Nighthawk, Tapacamino Selvático

FIGURE 32

Lurocalis semitorquatus noctivagus Griswold, Proc. New England Zool. Club, vol. 15, p. 101. (Salamanca Hydrographic Station, northern end of Madden Lake, Canal Zone.)

A nighthawk blacker than others, without a white bar in the wing; tail very short; flight erratic.

Description.—Length 190-200 mm. Tarsus feathered. Adult (sexes alike), upper surface black from forehead to upper tail coverts, including side of head, wing coverts and scapulars, dotted with more or less elongated spots of tawny; primaries with a few broken bars of tawny on outer web, tipped narrowly with white; inner secondaries and longer tertials barred heavily with grayish white, to form a prominent light spot on the upper surface of the closed wing; tail barred brokenly with pale tawny, tipped lightly with buff and white; neck and breast dull black, spotted rather heavily with pale tawny; a narrow transverse white band across throat; abdomen, flanks, under wing coverts and under tail coverts tawny brown, barred heavily with black.

Immature, with an irregular mixture of gray mottled with sooty and spotted heavily with brown and black on crown, back, and wing coverts; white throat band slightly barred with black.

A male, shot on Isla Cébaco January 13, 1965, had the iris wood brown; bill dull black, shading toward dull brown at the gape; bare

area of tarsus and toes brown, with the scutes outlined in dull white; claws slate.

Measurements.—Males (3 from Veraguas and Bocas del Toro), wing 177-190 (181.6), tail 71.1-77.6 (74.0), culmen from base 11.0-11.2 (11.1), tarsus 11.0-12.8 (12.1) mm.

Female (1 from Canal Zone), wing 174, tail 73, culmen from base 11.9, tarsus 11.0 mm.

Resident. Found in small number in forested areas of the Tropical and Subtropical Zones. Recorded on Isla Cébaco, Veraguas; Las Palmitas and Cerro Hoya (1,200 meters elevation), Los Santos (sight records); mouth of Río Teribe and Cricamola, Bocas del Toro; Juan Mina (sight record) and Salamanca Hydrographic Station, Madden Lake, Canal Zone; Río Tacarcuna (575 meters), Cerro Malí and Cerro Tacarcuna (1450 meters), Darién (sight records).

This is a widely distributed species in forested areas in Panamá, but little known as it is seen rarely. The first specimen from the Republic was a female taken by John A. Griswold, Jr., on February 21, 1936, at the old Salamanca Hydrographic Station on the lower Río Pequení, a site now on the shore of the northern end of Madden Lake. The second record, another female, taken by Hasso von Wedel, February 15, 1938, at Cricamola, Bocas del Toro, is in the museum collections at Princeton University. On March 7, 1960, Charles O. Handley, Jr., caught a male in a mist net set for bats at the mouth of the Río Teribe on the Río Changuinola, Bocas del Toro.

Sight records include 2 at Juan Mina, Canal Zone, on January 8, 1962, seen by Enrique van Horn flying over the Chagres at dusk among other nighthawks. On January 28 that year I flushed 1 in a forested area on the Río Guánico, Los Santos. Occasionally, during January and February, Handley saw them flying at dusk over the clearing at his camp at 1,200 meters on Cerro Hoya. In the Serranía del Darién, near the Colombian boundary, in February and March 1964, Handley and I saw them at intervals after sunset, crossing the small clearings in which our camps were located on Cerro Malí at 1,460 meters, and at 575 meters on the upper Río Tacarcuna.

On Isla Cébaco, Veraguas, in 1965, I had better fortune, as on January 13, my second day on the island, our helpers saw a short-tailed nighthawk, resting like any other of its relatives lengthwise of a large branch in a tree standing at the border of the swamp adjacent to our camp at Platanal. Others were seen subsequently at dusk and at dawn, and finally on January 18, George Barrett, Jr., shot another flying over the forested valley of the quebrada.

The species has the general appearance of the nighthawks of the genus *Chordeiles* but is distinguished in life by the much shorter tail, and by more erratic flight, in which the birds move swiftly in constantly shifting turns. In outline they appear darker also through lack of white markings on the wings and general blacker hue. They range frequently in pairs, appear in the open for a few minutes, and then disappear among the adjacent trees. It has been my impression

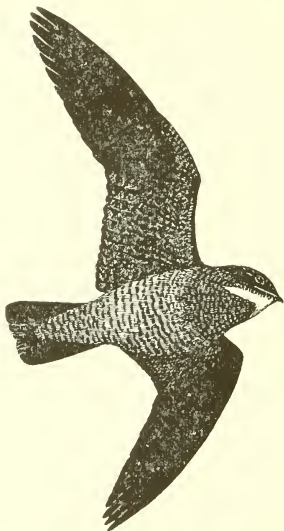


FIGURE 32.—Short-tailed nighthawk, tapacamino selvático, *Lurocalis semitorquatus noctivagus*.

that their feeding flights are mainly within the cover of the forest, or immediately above the tree crown where they can not be seen from below. The 2 taken on Cébaco had the stomachs filled with small beetles. All that I have observed have been silent. This brief outline is all that I have been able to record during the many hours in which I have watched for them at dusk and at dawn. Wharton Huber (Auk, 1923, p. 301) records that his specimen from Nicaragua, the first for Central America, was shot from a flock of "15 or 20 individuals that were flying back and forth over the Banbana River at dusk. . . . They were very noisy in flight, uttering a harsh call."

Our 3 specimens, 1 from Bocas del Toro and 2 from Isla Cébaco, agree in color with the type of *Lurocalis semitorquatus noctivagus* named by Griswold from 1 taken at the northern end of Madden Lake. These 4 in turn differ from the only other specimen yet recorded from Central America, a female collected by Wharton Huber on the Río Bambana (originally cited as Banbana) in northeastern Nicaragua. This bird has the primaries from the innermost to the eighth tipped with rufous, edged distally at the end with white, with a similar marking but of lesser extent on primaries 9 and 10. The outer webs of the primaries, except the tenth, are spotted rather heavily with rufous. The under tail coverts are pale cinnamon-buff, barred with black. In the 4 from Panamá the ends of the primaries are tipped very narrowly with white, with only a slight mixture of cinnamon, the rufous spotting on their outer webs is much less, and the basal color of the under tail coverts is dark cinnamon-buff. These slight differences may prove to be merely individual variation when more specimens have been examined. In that case the name will become *Lurocalis semitorquatus stonei* Huber, described in the Auk, vol. 40, no. 2, April 11, 1923, p. 300, with type locality Río Bambana, 10 miles above where it is joined by the Río Prinzapolca.

**CHORDEILES ACUTIPENNIS (Hermann): Lesser Nighthawk,
Tapacamino Menor**

FIGURE 33

Caprimulgus acutipennis Hermann, Tabl. Affin. Anim., 1783, p. 230. (Cayenne.)

Like the common nighthawk but smaller; with the white wing band across 4 (occasionally 5) outer primaries, located nearer the tip of the wings, beyond the center.

Description.—Length 190-220 mm. Two poorly defined color phases, one darker, one grayer. Outer webs of primaries spotted heavily with cinnamon-buff to buff. Male distinguished from female by a white bar across the end of the tail, otherwise sexes similar in color. Adult, crown black, lined and spotted irregularly with buff to grayish white; wings black, spotted and barred heavily with buff; a white band across 4 (in some 5) outer primaries, located beyond the center toward the tip of the wing; tail barred heavily with black and grayish white, mottled with dull black; rest of upper surface mottled with grayish white and buff (varying in depth of brown) streaked irregularly on the back, and barred on the rump and upper tail coverts with black; wing coverts dull black spotted heavily with buff and white; foreneck

and upper breast dull black barred with buff and mottled with grayish white; a broad band of white across upper foreneck; rest of under surface buff to buffy white barred with dull black.

This is the abundant species of nighthawk found in the Republic, distributed in the lowlands mainly outside extensive forests. It is seen in largest number in swampy areas, where the birds sleep during

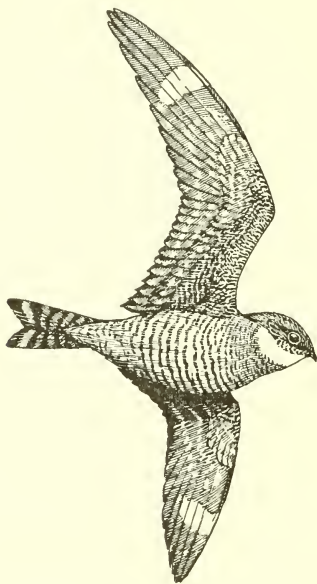


FIGURE 33.—Lesser nighthawk, tapacamino menor, *Chordeiles acutipennis*.

the day, resting lengthwise on open limbs shaded by the leaves of the tree crown overhead. They are found especially in mangrove swamps, and in woodland lining the banks of the larger rivers, particularly where trees stand in shallow water. At sunset they fly out to course for insects, that they capture in the scoop of the open mouth during steady flight. As darkness nears they tend to move farther away from their sleeping quarters, and then may appear in plazas in small towns, and over roads and open fields anywhere. Their flight is rapid, driven by strong wing strokes, to gain momentum, followed by set wings in

long sweeps and quick, erratic turns as insects appear in the air. When food is abundant, as over the open waters of the larger rivers, flocks of a hundred or so may join in scattered company. At other times they feed singly.

The small airstrips, now becoming common through the lowlands, are favorite hunting grounds. And here after feeding they often alight on the ground. In night-hunting with head lamps I have found that their eyes do not glow like those of other goatsuckers. When I have approached birds resting on the ground at distances of 75 meters no reflection was seen until the birds turned the head so that the light entered at an angle. Occasionally then I have perceived a very faint sheen of yellowish green. At a distance of 3 meters the eye glows ruby red, but farther away this color disappears.

Small beetles have been the main food that I have found in the stomachs of those taken for specimens. But the birds are opportunists as they take any small insects that fly, including termites when swarming, and small diptera, particularly those that hover in clouds.

The mouth lining in birds of this family is a thin, translucent sheet through which the bones of the palate may be seen in dim outline, and the bases of the large eyeballs show more clearly. The tissue of the lining is tough and strong, as it needs to be to avoid damage from the impact of hard bodied beetles taken when both bird and insect are in swift flight. In the nesting season males utter a variety of trilling notes and clucking calls, often when in close pursuit of a female. Although in display they may dart down for a few meters they do not produce the booming sound common in the other species of nighthawk. When nesting is completed the birds are silent.

The same superstition of potency as a love charm holds with the nighthawk as with others of the family. At Jaqué, Chocó hunters offered skins of these birds crudely removed and dried for trade in the stores. They were reputed to bring 5 to 10 balboas apiece in Panamá City.

Two geographic races of this species are found in Panamá, one a resident, and another that comes as a migrant from the north. Both range together.

When only small series of lesser nighthawks from Panamá and northern Colombia were available it was comparatively simple to identify them to geographic race under the formula outlined by Oberholser (U. S. Nat. Mus., Bull. 86, 1914, pp. 94-112) in his review of the genus *Chordeiles*, as it was assumed that all were migratory in this area. With this premise, larger, darker specimens were allocated

to *texensis*, and smaller, grayer ones to *micromeris*, the latter being regarded as migratory in spite of its accepted breeding range from southern México southward. This comfortable method of disposal ended when in late June 1953, with Eugene Eisenmann as companion, I collected a small series in the savanna area of the western part of the Province of Panamá. Those taken, which included young barely grown, were small and dark in color and so did not fit the pattern. As more of this type came to hand it became obvious that there was a breeding population in Panamá. This information has required a review that in brief summary may be stated as follows. Birds of the north to which the name *texensis* applies are whitish or very pale buff on lower breast, sides, and abdomen, with the rather indefinitely outlined band across the upper breast lighter gray. Above they show the usual variation from gray to blackish, with lighter markings pale buff to grayish white. They vary considerably in size, as indicated in length of wing and tail. According to present understanding this group breeds from central California and Texas to central Michoacán and southern Veracruz. It is migratory from the area north of central México, and then ranges through Central America and Panamá to northwestern Colombia.

The typical form *Chordeiles a. acutipennis* is the breeding bird in South America from northern Colombia (except in the upper Magdalena Valley where another race, *crissalis* Miller, is recognized), northern Venezuela, Trinidad, and Tobago south, east of the Andes, to northern Bolivia and southeastern Brazil. This is definitely smaller and is darker, blacker above in ground color, with the lighter markings paler, from grayish white to buff much as in *texensis*. The wing bar in some (not in all), and the tail bar in some of the males is narrower. On the under surface the lower foreneck is darker buff.

On first examination breeding specimens from Panamá may seem to be like typical *acutipennis* as they are dark in back and crown color. The lighter markings of the dorsal surface, however, are definitely deeper buff, and wing and tail bars are more variable in width. The size also averages somewhat larger. Actually they agree in size and color with the birds of more northern Central America recognized under the name *C. a. micromeris*. This then has a breeding range extending from southern México through the whole of Central America. It comprises an intermediate population both in size and color between the principal group of South America as at present recognized and *texensis* of the north.

The group as a whole offers difficulty in the assignment of some

specimens. It should be remembered that individuals only recently fully grown, marked by distinct light tips on the wing and tail feathers, usually are more rufescent.

In addition to the records based on specimens that follow I saw individuals of this species flying on Taboga Island, December 23, 1955, and at Almirante, Bocas del Toro, on several evenings between January 19 and 25, 1958.

CHORDEILES ACUTIPENNIS TEXENSIS Lawrence

Chordeiles texensis Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 6, December 1856, p. 167. (Ringgold Barracks, near Rio Grande City, Texas.)

Characters.—Size large; coloration lighter, less deep black, with the pale markings above fewer and paler, being grayish white to pale buff; white bars in the wings, in both sexes, and in the tail in males broader.

Measurements.—(From Ridgway, U.S. Nat. Mus. Bull. 50, pt. 6, 1914, p. 581), males, wing 173-192 (183.4), tail 104-119 (111.6) mm.

Females, wing 168.5-180 (175), tail 102-110 (106.1) mm.

(Bill and tarsal measurements are omitted as they show no significant differences.)

Migrant from the north. Locally common, mainly in the lowlands.

Recorded (by specimens) in Chiriquí (Puerto Armuelles, Alanje, San Félix); Los Santos (Pedasí); Canal Zone (Juan Mina); Panamá (La Jagua Hunting Club); and Darién (Cana, Jaqué).

The date of arrival in fall is not certain from available material. It is probable that they come in October, as there is a skin in the U. S. National Museum taken October 29, 1891, at San José, Costa Rica. Most of the birds I have seen were collected from December through March, with the last report, a specimen shot April 2, 1949, at Jaqué, Darién. This form appears to be common during the season of northern winter.

In the landward edge of the mangrove swamps below Alanje, Chiriquí, on the forenoon of March 13, 1960, I found dozens at rest in the trees. The two taken were so fat that they were prepared for skins with difficulty. I assumed that others in the assembly also were northern migrants.

A male, taken March 10, 1912, by E. A. Goldman at 550 meters elevation near Cana, on the slopes of Cerro Pirre, is the only record from a mountain area.

CHORDEILES ACUTIPENNIS MICROMERIS Oberholser

Chordeiles acutipennis micromeris Oberholser, U. S. Nat. Mus. Bull. 86, April 14, 1914, pp. 24 (in key), 100. (Xbac, Yucatán.)

Characters.—Average size smaller; general coloration darker; above definitely blackish with a mottling of grayish white, and spotting of buff and cinnamon-buff; ground color of lower surface usually slightly deeper buff.

The immature bird, mentioned beyond, taken near San Carlos, Panamá, on June 21, is heavily washed with cinnamon-buff on the entire dorsal surface, including the wing coverts and rump.

Measurements.—Males (6 from Panamá), wing 167-179 (172.6), tail 83.2-99.0 (92.1).

Females (11 from Panamá), wing 158-177 (167.8), tail 83.2-99.2 (91.0).

Resident. Local; recorded (by specimens) in Chiriquí (Puerto Armuelles, Alanje); Los Santos (Pedasí); Herrera (Santa María); Coclé (Aguadulce); Panamá (San Carlos, Juan Franco); Canal Zone (Farfan, Juan Mina, Barro Colorado Island, Gatun); San Blas (Puerto Obaldía); and Darién (Jaqué).

Individuals assumed to be this resident race were seen at Soná, Veraguas, June 9 and 11, 1953.

Near San Carlos, Panamá, on June 19, 1953, I noted a number flying, and observed others resting in the road in the entrance to Rio-mar. One of the latter obviously was a juvenile bird. On the evening of June 21, I shot one that was only recently on the wing. Three adults were taken June 22 from a flock of about 30; in these the sexual organs were in resting stage. Those that I have collected in other seasons from December to early April usually have been in company with individuals of the migrant race that comes to the Isthmus from the north.

CHORDEILES MINOR (Forster): Common Nighthawk,
Tapacamino Grande

With narrow, angular wings in which a white band crosses the 5 outer primaries (rarely only 4) near the center.

Description.—Length 220-245 mm. Outer webs of primaries plain, without prominent bars of brown and buff. Male distinguished from female by a white bar across the end of the tail, otherwise the sexes similar in color. Adult, above black spotted and mottled with cinnamon-buff, buff, or grayish white; primaries black, except for white

band; tail with mottled bars of grayish white or pale buff; neck and upper breast mainly dull black, mottled with indistinct bars of white to buff; a prominent band of white, often washed with buff, across the upper foreneck; breast, sides, abdomen, and under tail coverts white to buff, barred narrowly with dull black; edge of wing white; a white band across inner webs of primaries nearly at center of wing.

The races of the common nighthawk that nest in North America are migrant to South America. Three forms of these northern birds have been recorded from Panamá, in addition to the population that is resident. It is probable that other migrant races will be found in due course.

The two species of the genus found in Panamá are so similar in appearance when flying that identification by sight is uncertain. The voice of the common nighthawk is a loud, single note, *peent*, and males in display frequently dart downward in the air for several meters, and then, in an abrupt turn at the end of the descent, through air rushing past the wings produce an abrupt roaring sound audible at a considerable distance. These identify the breeding males immediately, but do not serve with migrants as these birds do not display. When clearly seen at rest the position of the white spot in the wing serves to separate the two, but otherwise usually there will be doubt in sight identifications. Most of the migrants pass through rather rapidly. To the present they have been recorded only in September and October. The period of the spring flight is not known. It is probable that their migrations are mainly along the Caribbean coast.

CHORDEILES MINOR MINOR (Forster)

Caprimulgus minor J. R. Forster, Cat. Anim. North Amer., 1771, p. 13.
(South Carolina.)

Characters.—Decidedly darker, blacker above, with fewer pale markings; lower surface usually with dusky bars broader.

Measurements.—(From Ridgway, U. S. Nat. Mus. Bull. 50, pt. 6, 1914, p. 563.) Males, wing 184-208 (198), tail 106-118 (110.9) mm.

Females, wing 187.5-203 (196.5), tail 105-118.5 (112) mm.

Migrant from the north, abundance uncertain.

Recorded (by specimens) in Bocas del Toro (Río Sixaola, Carriker, Sept. 24, 1904), Canal Zone (McLeannan, date not recorded), and San Blas (Permé, Wedel, Oct. 15, 1929).

CHORDEILES MINOR CHAPMANI Coues

Chordeiles popetue chapmani Coues, Auk, vol. 5, no. 1, January 1888, p. 37. (Gainesville, Florida.)

Characters.—Dark in color above, like *minor*, but decidedly smaller.

Measurements.—(From Ridgway, *loc. cit.*, p. 574.) Males, wing 178-192 (184.1), tail 99-110.5 (105) mm.

Females, wing 172.5-184.5 (179.4), tail 99-108.5 (103.2) mm.

Migrant from the north, abundance uncertain.

Recorded (from specimens) in Bocas del Toro (Río Sixaola, Carriker, 2, September 24 and 26, 1904; Almirante, Gorgas Memorial Laboratory, 1, September 7, 1962) and Canal Zone (Gatun, Jewel, October 3, 1911). The bird last mentioned, from Gatun, was reported by Stone (Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, p. 253) in error as a specimen of *C. m. minor*.

CHORDEILES MINOR SENNETTI Coues

Chordeiles popetue sennetti Coues, Auk, vol. 5, no. 1, January 1888, p. 37. (50 miles west of Pembina, North Dakota.)

Characters.—Paler, grayer, with lighter markings on dorsal surface about equal to the darker ones, the whole area finely mottled; similar in size to *minor*.

Measurements.—(From Ridgway, *loc. cit.*, p. 569.) Males, wing 186-213 (198.3), tail 101.5-112.5 (109.1) mm.

Females, wing 175-201 (189.5), tail 102.5-115 (108) mm.

Migrant from the north, abundance uncertain.

One record from San Blas (Permé, Wedel, October 18, 1929).

CHORDEILES MINOR PANAMENSIS Eisenmann

Chordeiles minor panamensis Eisenmann, Amer. Mus. Nov. no. 2094, June 27, 1962, p. 4. (Cerro Campana, western Province of Panamá, elevation about 750 meters, Panamá.)

Characters.—Similar in size and black dorsal background color to *C. m. chapmani*, but with other markings darker, buff to rufous; under surface buff to tawny.

Measurements.—Males (2 specimens), wing 181, 189, tail 96.0, 98.4, tarsus 14.7, 15.7 mm.

Females (7 specimens), wing 172-184 (176.7), tail 93.5-99.5 (95.9), tarsus 14.0-14.8 (14.3) mm.

Found nesting locally on the Pacific slope.

Recorded (from specimens) in Chiriquí (Francés), Panamá (Cerro Campana, Panamá City, Chepo), Canal Zone (Balboa, Corozal).

The presence of common nighthawks in the Republic during May, June, and July was first recorded by Eugene Eisenmann (Wilson Bull., 1951, p. 184), who saw them and heard them calling regularly in 1948, 1949, and 1950. Following other observations in later years, in company with J. E. Ambrose, Dr. Eisenmann collected a female with a recently hatched young bird, on an open, rocky hillside at 750 meters elevation on Cerro Campana, in the western sector of the Province of Panamá. With this proven breeding bird as basis for comparison with other material, several additional specimens were obviously similar, so that it was possible to distinguish the resident population from the northern migrants that pass through the Isthmus.

Eisenmann, with others, has recorded males booming frequently during the month of April in the Juan Franco suburb of Panamá City, around the Paitilla and Tocumen airports, and in late June over Cerro Azul. On March 24 and 29, and April 1, 1949, I heard one or two performing at dusk at the La Jagua Hunting Club. Later, on April 21, W. M. Perrygo and I collected a female as it flew over a savanna area near the highway, about 8 kilometers west of Chepo. In older records I have found a female of this race in the Salvin-Godman collection at the British Museum, collected by McLeannan, marked "Panama" without other data, but presumed to have come from the line of the Panama Railroad. There are 2 females in the Rothschild collection at the American Museum of Natural History, taken October 24 and November 4, 1905, by H. J. Watson at Francés, Chiriquí, on the southern base of the volcano. Two females collected by Hallinan (Auk, 1924, p. 315) in the Canal Zone in 1916, near Balboa, May 13, and Corozal May 21, now in the American Museum of Natural History, also are this resident race. There is a female listed by Eisenmann in the Dickey Collection from Hacienda El Pelón, Guanacaste, Costa Rica.

Olson and Eisenmann (Auk, 1966, pp. 469-470) describe a set of 2 eggs, partly incubated, found by Olson May 12, 1963, "on a hill on the outskirts of Panama City, 4 miles east of Albrook Field" as creamy white to pale buff, densely and finely marked with ochraceous-brown and gray. They measured 30.5×22.0 and 29.2×21.6 mm.

As Dr. Eisenmann has suggested, this race is not resident, but may be migratory, after nesting, to South America.

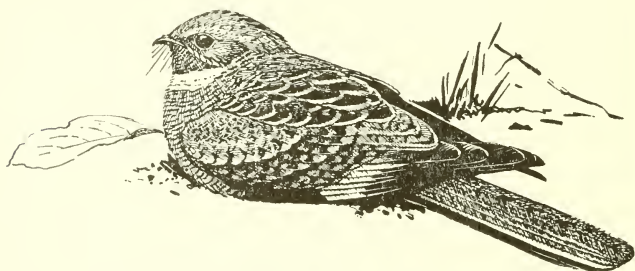
NYCTIDROMUS ALBICOLLIS (Gmelin): Pauraque, Capacho

FIGURE 34

Caprimulgus albicollis Gmelin, Syst. Nat., vol. 1, pt. 2, 1789, p. 1030. (Cayenne.)

The common ground-inhabiting goatsucker, known by its loud, accented call; legs longer than in other species of the family found in Panamá as indicated by the length of the tarsus (see measurements).

Description.—Length 225-250 mm. There are two color phases, shown mainly in the upper surface, one deep, warm brown, the other distinctly gray, with individual variation that shows complete gradation between the two. Male, above gray, rufous-brown, or variously intermediate between these extremes, streaked narrowly with black and mottled very finely with pale gray or buff on crown, hindneck, and back; primaries black, with a bar of white (sometimes washed with buff) across both webs, slightly distal to the center on the outer 5;

FIGURE 34.—Pauraque, capacho, *Nyctidromus albicollis*.

secondaries black barred and spotted with buff; wing coverts and tertials spotted and barred boldly with black and buff; side of head bright buffy brown; a band of white across the foreneck; throat black barred with buff; breast brown or gray, mottled with light gray or buff; rest of under surface buff, barred narrowly with dull black; outer tail feathers black, more or less mottled with buff, second and third from the outside broadly white on inner web for terminal half.

Female, and immature of both sexes, similar, but with the white wing band narrower, and the light markings in the tail reduced to a small terminal spot that often is partly or wholly buff, and in immature birds may be absent.

According to current understanding, seven geographic races may be recognized through the range of the species, which extends from

northern México and southern Texas through Central America and the tropical and subtropical areas of South America to northern Argentina (Entre Ríos and Misiones) and southern Brazil (Rio Grande do Sul). Two subspecies are found in Panamá.

While a usual name for the species in Panamá is *capacho*, a Spanish Americanism that signifies a night-bird, in the savannas east of Panamá and in Darién these birds are known as *buhío*, in imitation of their call. At Almirante some called them "gim-me-bit," obviously a term imported from Jamaica, where it is applied to another species of the family, the local nighthawk.

NYCTIDROMUS ALBICOLLIS GILVUS Bangs

Nyctidromus albicollis gilvus Bangs, Proc. New England Zool. Club, vol. 3, March 31, 1902, p. 82. ("Santa Marta" = Bonda, Magdalena, Colombia.)

Characters.—Averaging slightly paler in color than *N. a. intercedens*, and also somewhat smaller (though there is broad overlap in size); bill usually slightly smaller in bulk (though many appear equal).

Males, taken in 1965, on Isla Gobernadora, Veraguas, January 8, and near El Volcán, Chiriquí, March 1, had the iris mouse brown to dark mouse brown; thickened margin of eyelid dull brownish yellow; basal area of bill, including the nasal tubules, dull fuscous; tip black; tarsus mouse brown; toes dull brown to black; claws fuscous to black.

Measurements.—Males (28 from Panamá), wing 143-154 (149.1), tail 130-145 (136.2), tarsus 22.6-25.4 (23.9) mm.

Females (22 from Panamá), wing 138-155 (145.0), tail 120-136 (127.4), tarsus 22.0-25.5 (23.9) mm.

While the mouth opening is large, the culmen is too short (7 mm. or less) in these birds to afford useful measurements. Tail measurements are variable as the ends of the feathers are subject to much wear in this ground-dwelling bird.

Resident. Common, widely distributed throughout the Isthmus from the coastal lowlands to 1,800 meters elevation in the mountains in Chiriquí, and to high elevations through the mountain areas elsewhere. Less abundant in regions of dense rain forest than in more open areas. Isla Gobernadora, Isla Cébaco; Archipiélago de las Perlas (Isla del Rey, Isla San José, Isla Pedro González).

This is a nocturnal species, usually known and recorded from its call notes, heard regularly from dusk to dawn. In daytime the birds remain secluded on the ground in thickets or in forest areas, usually where a few square meters are fairly clear and open. When startled they rise from the resting place, dart away with silent, erratic flight

and almost immediately drop down again, usually behind cover. Occasionally after a short flight one may perch on a log or low branch, where it rests lengthwise as an aid to concealment. In rainy season, when low areas are flooded, as in thickets bordering the La Jagua marshes, it is more common for them to select such slightly elevated resting places. Rarely, at night, I have encountered them from 3 to 10 meters above the ground.

As night approaches they leave the daytime resting place and move out into more open areas to feed. If in forest they may be found then along the open banks of streams, or in small openings made by storm-felled trees. Fields and pastures always are attractive, as are the savannas of the Pacific slope, and in such locations they remain throughout the night.

As noted in the beginning, the legs in these birds proportionally are longer than in tree-perching members of the family. On the ground they rest with head drawn in and the body prone as in their relatives, but when approached they may extend the head and then retract it, or raise the body and then drop back. More rarely one may walk a few steps. On one occasion when I encountered a member of this race resting on a low branch in a flooded thicket the bird perched for a time across a limb with the tail hanging straight down like a trogon.

The *capacho* feeds extensively on beetles, particularly on scarabaeids, but including others, as passalids, cerambycids, elaterids, and curculionids. Several of those that I have handled have been so crammed with these insects that the bulging stomach made a firm, hard projection on the external surface of the abdomen.

They seem to see well in daytime, and often when flushed appear quite alert. Once, near Pedasí, one rested in the sun in a small opening in dry monte, apparently sun-bathing, as shade was accessible only a few meters away.

The usual call, loud and strongly accented, resembles *whoo-oo wé oo*, the first syllable somewhat drawn out, the last two delivered rapidly. Sometimes the first syllable is omitted. Another call is a rapid repetition of a single syllable, *whip, whip, whip, whip*. Occasionally when one is disturbed in the monte it utters a low, barely audible growling sound. Their notes are heard mainly in evening and at dawn, except that on clear, moonlit nights, particularly in the nesting season, they call steadily all night long. On some occasions at dawn in January at La Jagua the chorus from all sides has been a truly amazing volume of sound. Rarely they may begin from heavily shaded woodlands while sunset light still brightens the open sky. And once, on the Río

Chucunaque early one morning a male flew ahead of me twice in open forest, and then began to call, though the sun was an hour high, and the entire area was alight.

In night-hunting this is the bird most frequently encountered. The eye glows with an orange-red reflection that may be visible for more than a hundred meters, particularly when the *capacho* rests on a termite mound, a log, or some other slight elevation. The eye color is so similar to that of glowing coals that during the period of dry season burning I have had to look closely to make certain that the spot of light I had in view was bird and not fire. In driving at night their eyes shine regularly at the roadside in the lights of the automobile, and when male birds fly into this illumination the white markings of wing and tail show prominently. They sometimes appear dazzled by the spot light of an electric torch, and with sufficiently slow and careful approach may be seized by hand.

The nesting season begins in February and extends through May. By the end of the latter month well-grown young may be on the wing. The 2 eggs that constitute a set are laid in a slight scrape on open ground, or may be placed on the scanty padding of a few dry leaves. They are subelliptical to long elliptical in shape, smooth, faintly glossy, and vary in ground color from lighter than pale pinkish buff to brighter than vinaceous-buff. The entire surface has faintly outlined spots and small blotches of fawn color, that vary to avellaneous when thinly overlaid with deposited shell. The material examined includes 2 sets of 2 each, collected in 1911 by E. A. Goldman in the Canal Zone, at Tabernilla April 20 and Frijoles, May 9. These have the following measurements, in order as listed, 30.2×22.3 , 29.9×22.6 ; 29.9×22.7 , 31.4×21.1 mm. Others presented by Major General G. Ralph Meyer, include a single egg taken in the Forest Reserve, May 3, 1941, a set of 2 from Madden Lake, May 13, 1941, and another set of 2 from Fort Clayton, May 2, 1943, all in the Canal Zone. These, in order, measure as follows; 28.2×21.6 ; 28.9×21.9 , 28.5×21.4 ; and 28.2×20.6 , 29.4×21.5 mm. A set of 2 that I found at an elevation of 1,200 meters at Santa Clara, Chiriquí, on February 21, 1955, have the following sizes: 28.5×20.1 , 28.3×20.5 mm. Another set of 2, nearly ready to hatch, collected at La Jagua, Panamá, March 20, 1961, measured 30.1×21.3 , 29.5×21.4 mm. These were too far along in incubation for preservation.

One evening, near Santa Clara, Chiriquí, while hunting at night, I shot a female as she rested on open ground outside a thicket, and found

that she was covering 2 eggs. The following noon, when I returned to take some photographs the male was incubating.

The race *gilvus* ranges to the south through Colombia, except in the southeastern llanos in the region of Caquetá, and is found in Venezuela north of the Amazonian drainage of southern Amazonas. The region to the south of these limits is inhabited by the typical race, *N. a. albicollis*. From this *gilvus* differs in paler color, especially on the sides of the head.

In Panamá it is interesting to observe that while *N. a. gilvus* is found on the larger islands of the Perlas group in the Gulf of Panamá, and on the islands of Gobernadora and Cébaco at the mouth of Golfo de Montijo, it does not reach Isla Coiba.

NYCTIDROMUS ALBICOLLIS INTERCEDENS Griscom

Nyctidromus albicollis intercedens Griscom, Amer. Mus. Nov., no. 370, October 17, 1929, p. 8. (Tela, Honduras.)

Somewhat darker and more heavily pigmented than *N. a. gilvus*.

Measurements.—Males (14 from Honduras, Nicaragua, Costa Rica, and Panamá), 150-158 (153.8), tail 131-152 (140), tarsus 24.2-26.8 (25.6) mm.

Females (10 from Guatemala, Honduras, Costa Rica, and Panamá), wing 150-158 (153.5), tail 127-143 (133.3), tarsus 24.0-25.6 (25.0) mm.

Resident. Common in western Bocas del Toro (Sibube, Changui-nola, Río Changuena, Almirante).

Birds from the localities listed agree with the race *intercedens* of the southern area of Central America, from Guatemala through Costa Rica, in slightly darker average color. It is probable that the range of the race in Bocas del Toro does not extend east of the Chiriquí Lagoon.

A single egg, received from Dr. Pedro Galindo, collected at Almirante, Bocas del Toro, April 17, 1962, is long elliptical, smooth, with faint gloss, in color pale pinkish buff, marked obscurely with irregular spots of pinkish cinnamon and vinaceous-buff, and more faintly with varying shades of purplish gray. It measures 29.9×21.9 mm. A second egg, also from Dr. Galindo with the same locality data, dated June 2, 1962, is subelliptical, colored like the first, but with the markings somewhat more definite, and distributed more uniformly over the entire surface. It measures 29.4×21.3 mm.

CAPRIMULGUS CAROLINENSIS Gmelin:
Chuck-will's-widow, Guabairo

FIGURE 35

Caprimulgus carolinensis Gmelin, Syst. Nat., vol. 1, pt. 2, 1789, p. 1028. (South Carolina.)

The largest species of the family found in Panamá, in color dark buffy brown.

Description.—Length 270-300 mm. Differs from all related species in having lateral filaments on the basal half of the rictal bristles. Male, above brown, grayer on tertials and scapulars, very finely vermiculated with black mixed slightly with buff; crown and back streaked with black; tertials and greater wing coverts heavily spotted with black; lesser wing coverts black, dotted with buff; primaries black,

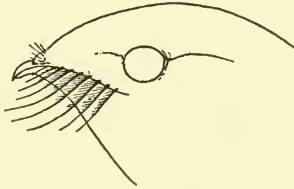


FIGURE 35.—Outline of head of Chuck-will's-widow, guabairo, *Caprimulgus carolinensis*, to show fringed rictal bristles.

heavily barred with tawny; central rectrices barred and dotted indistinctly with black; 3 outer pairs extensively white or buff; side of head and upper throat clay color, barred with dusky; a band of white or buff across foreneck; breast mottled, like back, with white or buff spots in the center; abdomen, under tail coverts, and under wing coverts cinnamon-buff, barred with dusky.

Female, somewhat paler; outer tail feathers tipped narrowly with deep buff to tawny, without extensive white or buff markings. (Some males, apparently immature, have the pattern of the tail like that of females.)

Measurements.—(From Ridgway, *loc. cit.*, pp. 507-508). Males, wing 206.5-225 (213.9), tail 138.5-151 (144.1), tarsus 17.5-19 (18.4) mm.

Females, wing 201.5-215 (209), tail 130-144 (136.4), tarsus 17-19 (17.9) mm.

Migrant from the north. Found occasionally throughout forested

areas, mainly in the lowlands, ranging to 1,600 meters in the mountains in Chiriquí and to 600 meters in Darién. Present from mid-October to late March.

The following are available records:

Chiriquí (Lérida, October 16, 1937; Divalá, November and December 1900; Sereno, February 21, 1955; Bajo Mono, March 3, 1932; Boquete, March 10, 1901; El Volcán, March 29, 1954).

Coclé (Antón, December 5, 1927).

Canal Zone (Farfan Beach, October 27, 1953; Barro Colorado Island, November 1931, January 16-19, 1964; at sea off Colón, October 30, 1927).

Bocas del Toro (Almirante, October 20, 1962).

Panamá (Panamá City, March 22, 1911).

Darién (Río Tacarcuna, 575 meters, March 9-16, 1964); Yaviza, December 1, 1966 [P. L. Slattery].

San Blas (Permé, November 3, 1929).

Dr. Kenneth Parkes informs me that a specimen, now in the Carnegie Museum, reported as the present species by Aldrich (Scient. Publ. Cleveland Mus. Nat. Hist., vol. 7, 1937, p. 66) from Altos Cacao, Veraguas, March 17, 1932, is *Caprimulgus rufus minimus*.

The *guabairo* may be confused with the resident rufous goatsucker of similar color pattern since both live mainly on the forest floor, and usually are seen only as they flush and fly off on broad wings to hide again in cover of undergrowth. The larger size of the present species, however, usually is evident. It is strictly nocturnal, coming out in open areas at dusk, and seeking cover again before the sun appears. At Barro Colorado I have seen a *guabairo* in the dim light of early dawn perched crosswise on the hand rail at the head of the stairway leading to the boat landing. From this vantage point it flew out to capture flying insects. At our camp on the Río Tacarcuna, in the foothills below Cerro Malí, one evening at dusk I saw a bird of fair size fly into the high limbs of one of the tallest trees, where it perched 60 meters or so above the ground. I shot it, believing it to be a small hawk so that it was a distinct surprise to find it was the present species. A large cicada (identified later in our entomological laboratories as *Fidedicena picea* Walker) was swarming in the tree crown. The bird had the stomach crammed with 3 of these insects, 1 entire, and the others merely broken in two. The bird was so heavy with greasy fat that it required care to prepare as a specimen. During subsequent evenings I saw *guabairos* regularly high up in the forest canopy, where they made constant flights up into the higher branches. I was certain

they were feeding on the abundant cicadas. In many years of familiarity with this bird, this has been the only occasion when I have seen it other than on or near the ground.

In its winter home the chuck-will's-widow is silent.

CAPRIMULGUS RUFUS MINIMUS Griscom and Greenway:
Rufous Nightjar, Dormilón Moreno

Caprimulgus rufus minimus Griscom and Greenway, Bull. Mus. Comp. Zool., vol. 81, May 1937, p. 424. (Panama City, Panamá.)

Slightly smaller, and somewhat brighter brown than the chuck-will's-widow; differs also from that species in having smooth rectal bristles, without lateral filaments.

Description.—Length 245-265 mm. Male, similar in pattern of markings to the chuck-will's-widow, but somewhat brighter brown; distal end of outer rectrices darker buff, less white.

Female, similar to that sex in the chuck-will's-widow, but brighter, more rufous-brown; tips of outer rectrices darker buff.

Measurements.—Males (3 from Panamá and Venezuela), wing 175-184 (179.3), tail 112.7-121.0 (117.8), tarsus 18.2-19.2 (18.7) mm.

Females (11 from Panamá and Colombia), wing 170-179 (175.7), tail 102.1-116.5 (110.8), tarsus 16.2-18.8 (17.4) mm.

Resident. Found locally in forested areas in the Tropical Zone, mainly on the Pacific slope. Chiriquí (south slope of the volcano); Veraguas (Altos Cacao, Santa Fé); Panamá (Panamá City, Río Pacora, Chepo, Chimán, Río Majé); Canal Zone (Albrook Field, Curundu, calling); Darién (Garachiné, Pucro, calling). Two records on the Caribbean side: Bocas del Toro (Río Changuena); San Blas (Puerto Obaldía).

This strictly nocturnal species, from somewhat scanty information, seems to be fairly common only in a limited area on the Pacific slope in the Canal Zone and the eastern Province of Panamá. Records from elsewhere are few and scattered. The race was named from a female taken by W. W. Brown, Jr., near Panamá City, on May 6, 1904, but for a considerable period was little known. In 1949 I collected specimens on the Río Pacora and near Chepo, and the following year found it fairly common above Chimán, and on the lower Río Majé at Charco del Toro. Frequently, in other years, I have heard it calling at Albrook Field, and Curundu, in the Canal Zone. It was fairly common also on Isla Coiba in January 1956. Aside from this, there

is a specimen in the British Museum taken by Arcé in 1870, labeled as from the southern slope of the Chiriquí Volcano. Griscom (Amer. Mus. Nov., no. 280, 1927, p. 1) says that Benson secured 1 in Veraguas, but did not give the definite locality. The specimen, in the American Museum of Natural History, was taken at Santa Fé, April 6, 1925. As noted above, 1 was taken by Aldrich at Altos Cacao, Veraguas, March 17, 1932. Bond and de Schauensee (Acad. Nat. Sci. Philadelphia, Monogr. 6, 1944, p. 29) record 2 from Garachiné, Darién, in 1941. Griscom (Amer. Mus. Nov., no. 282, 1927, p. 4) reported 2 seen there in February 1927. One called near my house at Pucro, Darién, January 29, 1964. Griscom also (Bull. Mus. Comp. Zool., vol. 72, 1932, p. 328) recorded a female from Puerto Obaldía, San Blas. We have 1 secured by Dr. Galindo on the Río Changuena, Bocas del Toro, in September 1961. On February 3, 1963, I flushed 1 in high forest on Isla Parida, off the coast of Chiriquí, but did not secure it.

The birds are forest inhabitants mainly in rolling terrain where hills are low. In the savannas I found them in thickets and the more extensive stands of trees inland toward the higher country. They rest on the ground in cover of the undergrowth, and when startled rise on noiseless wings, fly low and swiftly a few meters, and disappear immediately in the nearest cover. Often they lie close, as I have had individuals rise behind me, when I chanced to startle them by firing at another bird. After a few encounters, when I flushed a rufous nightjar I learned to follow quietly, and by watching carefully sometimes found it resting on a log or on low vines where it was easier to see than on dead leaves on the ground. On Isla Coiba they were fairly common, while the pauraque, abundant on the mainland, was absent, possible indication of some competition between the two, as their usual haunts are similar.

Males call steadily from dusk to dawn, sometimes from perches 10 to 20 meters or so above the ground. Near at hand the sound is decidedly harsh. It begins with a low note, and continues with three others of different pitch that are loud and ringing. The song may be written *chuck, wee-wee-oh*. Beyond a brief distance the first note is not heard, and the harsh, burring quality of the others is softened so that the effect is pleasing. The whole suggests the song of the chuck-will's-widow as heard on its nesting grounds in the north.

Occasionally one increases the rapidity of the call for a brief period, like related species in the early part of the breeding season. At the Charco del Toro camp I heard 3 calling simultaneously, an index to the abundance at this point. The birds covered considerable territory in

feeding, though they remained entirely within the forest. It was interesting to note that at our camp in the heavy timber inland at the base of the Cerro Chucantí none were recorded. The nesting cycle apparently begins in late January, and continues through May. In 1950 I heard the first one on February 24 at a camp near the mouth of the Río Corotú above Chimán. For the first night or two the calls were brief with broken, uncertain cadence, but 4 days later the birds were in full voice. In March, they sang regularly at our camp at Charco del Toro near the head of tidewater on the Río Majé. I have heard them also during April and early May in wooded areas at Albrook Field and Curundu in the Canal Zone.

Major General G. Ralph Meyer found a nest on the ground at Madden Lake, Canal Zone, May 11, 1941, that held an egg so completely incubated that it hatched a few hours later. The only data taken were the measurements, 30.7×23 mm. On Isla Coiba on January 29, 1956, I shot a female that flew up from the ground to perch on a log, and then found that she had come from a nest. This was in a small space free of plant growth beside a fallen log. A single egg lay in the center of a brown, thick-bodied dead leaf about 15 centimeters long by 4 wide. Two small, freshly plucked green leaves had been placed on the larger one. On this background the light-colored egg stood out clearly with no semblance of concealment. The egg is elliptical, and measures 30.8×23.5 mm. The shell is glossy, in color white, very faintly tinged with buff, marked irregularly over the entire surface with spots of French gray to lilac-gray, with a few that are cinnamon-drab, some scattered, but most of them grouped at one end. Many of the markings are irregular in outline. Apparently 2 eggs constitute a set, as in the chuck-will's-widow, since when I skinned the parent I found that the oviduct held a fully developed ovum ready for deposition of the shell.

In night-hunting I have followed the calls of males on various occasions but have never succeeded in shooting one of this sex in such pursuit, as they have flown on the instant that the beam of the lamp came probing among the branches of the tree in which they rested. In fleeting glimpses I noted only that the eyeshine was orange to red, as is usual in this genus. The 7 specimens that I have collected in Panamá have been found during the day. The single male secured, taken on Isla Coiba January 10, 1956, has the 2 outer primaries not quite fully grown, following molt.

In specimens at hand there is individual variation in depth of

rufescent color, apparently an indication of slight differences in grayer and browner phases. These however, are not clearly evident.

To the south the race *minimus* ranges across northern Colombia.

CAPRIMULGUS VOCIFERUS VOCIFERUS Wilson:
Whip-poor-will, Dormilón de Paso

Caprimulgus vociferus vociferus Wilson, Amer. Orn., vol. 5, 1812, p. 71, pl. 41, figs. 1-3. (Philadelphia, Pennsylvania.)

Similar in size to *Caprimulgus saturatus* but grayer, with a light band across the foreneck.

Description.—Length 225-250 mm. Male, above mixed grayish brown and brownish gray, finely vermiculated with dusky; crown with a broad central streak and very narrow lateral ones of black; scapulars blotched with black, margined with buff; back and rump narrowly streaked with black; wing coverts brown to grayish brown, spotted with buff and marked finely with dusky; primaries and primary coverts dull black; primaries spotted on outer webs and barred on inner webs with dark buff or clay color; secondaries mottled with gray and buff; central tail feathers mottled gray, barred irregularly with black; outer rectrices brownish black, mottled and barred somewhat with buff, 3 outer pairs tipped broadly with white; throat brownish black, barred with tawny and buff; foreneck with a band of white varied to buff; breast brownish black, mottled with gray and buff; abdomen paler, with narrow, irregular bars of black; under tail coverts buff barred narrowly with black; under wing coverts cinnamon-buff, barred with dusky.

Female, similar but browner, with narrower tail tips of buff.

Measurements.—(From Ridgway, *loc. cit.*, pp. 516-517). Males, wing 149-168.5 (152.4); tail 113.5-128 (123), tarsus 15.5-18 (16.5) mm.

Females, wing 147-163 (155.3), tail 105-123.5 (116), tarsus 16-18 (16.6) mm.

Migrant from the north. One record for Volcán Barú, at 2,000 meters, above Cerro Punta, Chiriquí.

On March 8, 1955, in a forested area with low undergrowth much mixed with bamboo I flushed from the ground. It was shy, but made only short flights as we stalked it, until finally it alighted on a mass of creepers 2 meters above the ground where it was seen and shot.

This eastern race of the species nests from central Saskatchewan, southern Quebec, and Nova Scotia south, east of the Great Plains, to northeastern Texas, northern Mississippi, and eastern Virginia. In

the northern winter it is found regularly south to El Salvador and Honduras and has been reported casually south to Costa Rica, where Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 138) lists 4 specimens. The record from Chiriquí is the first from Panamá. The locality is about 100 kilometers east-southeast of El Pozo del Río Térraba, the most southern point at which the bird has been found in Costa Rica.

**CAPRIMULGUS SATURATUS (Salvin): Dusky Nightjar,
Dormilón Serrano**

Antrostomus saturatus Salvin, Proc. Zool. Soc. London, November 1870, p. 203.
(Southern slope of Volcán de Chiriquí, Chiriquí, Panamá.)

Size small, very dark, without prominent light bands on hind or foreneck.

Description.—Length 210-225 mm. Male, above sooty black, marked rather finely with cinnamon-rufous spots, that in part unite to form narrow, irregular bars; lores largely cinnamon-rufous; scapulars spotted prominently with black, the sides whitish, the markings more or less concealed; outer web of primaries spotted, and secondaries barred, with cinnamon-rufous; central tail feathers with indefinite bars of cinnamon-rufous; 3 outermost tipped broadly with white, with the rufous barring restricted; foreneck with an indefinite, partly hidden, very narrow band of white and buff; rest of foreneck and breast like back, but with a few scattered spots of white; extreme lower breast and abdomen cinnamon-buff to buff, barred narrowly with black; under tail coverts buff, with fewer black bars; under wing coverts black, with a very few cinnamon-buff spots.

Female, with cinnamon-buff markings larger, so that this color is predominant; light tips on tail narrower, in color buff.

Iris dark brown; commissure dull light brown, rest of bill black; tarsus mouse brown; toes and claws dull black (with all tarsal and toe scutes outlined in dull white).

Measurements.—Males (14 from Costa Rica and Panamá), wing 149.5-159 (153.9), tail 100.1-119.8 (112.4), tarsus 14.0-17.1 (15.2) mm.

Females (11 from Costa Rica and Panamá), wing 149.3-159.0 (153.9) tail 104.4-120.5 (113.1), tarsus 15.2-16.5 (16.0) mm.

Resident on the higher slopes of Volcán Barú, Chiriquí. Recorded from 2,000 to 3,100 meters.

This dark-colored whip-poor-will was described from a male taken by Enrique Arcé in 1870 on the "southern slope of the Volcano of

Chiriquí" according to the label on the type in the British Museum. Salvin (Proc. Zool. Soc. London, 1870, p. 177) in his account of the collections made by Arcé writes that they "were formed on the southern slope of the Volcano, the highest point reached being about 6500 feet above sea-level." It is doubtful that the species occurs at that low elevation (about 2,000 meters) at the present time. The next specimen from Panamá appears to be a female in the Mönniche collection, recorded by Blake (Fieldiana: Zool., vol. 36, 1958, p. 515). This was collected on the volcano at about 3,100 meters on August 31, 1937. Three in our collection were taken in 1965, male and female, prepared by E. Tyson, secured February 16 and 19, and a male shot by George Barrett February 24. All 3 were collected near a camp at 2,300 meters elevation on the trail that ascends the west face of Volcán Barú above the settlement of El Volcán. No others were seen there during work that continued to March 12 when the camp was closed.

In Costa Rica this species, according to Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 138), is found through the central highlands, where locally it may be common. Slud describes it as "a non-forest species that enters clearings, openings, and park-like pastures at night and rests in thickets and along woodland borders during the day." He speaks of it as perching and foraging from branches several meters above the ground, which agrees with the reports that I received of the bird in Chiriquí. Its call Slud says is "an unmistakable *whip-poor-will* with an introductory *chick* or *chip*."

In a recording made by Irby Davis, which he kindly played for me, the song was repeated steadily as it is in the familiar northern species. In the recording there was no indication of the low preliminary note, usual in the northern bird, which however is described by Slud. In a technical analysis of his spectrogram Davis (Texas Journ. Sci., vol. 14, 1962, pp. 81-84) has found a somewhat slower, less abrupt utterance in the first note, so that he renders the song as *che-e-er-poor-will*.

It is possible that the population of Panamá, known at present only from Barú, is isolated from that of Costa Rica, since Dr. Slud informs me that he did not record this species during a journey along the Cordillera de Talamanca, toward the Panamanian border at a season when the birds should have been calling.

CAPRIMULGUS CAYENNENSIS ALBICAUDA (Lawrence):
White-tailed Nightjar, Dormilón Chico

Stenopsis albicauda Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 11, February 1875, p. 89. (Talamanca, Costa Rica.)

Smallest of the true goatsuckers in Panamá, with a prominent ochraceous-buff to cinnamon band across the hindneck; a light band across the primaries as in the nighthawks; with prominent rectal bristles.

Description.—Length 205-220 mm. Male, crown dull black centrally, edged and tipped with gray, and mottled with dusky mixed lightly with cinnamon-rufous; sides and occiput gray, mottled finely with buff and dusky; a broad band of ochraceous-buff across the hindneck; back gray mottled with dusky and buff, with irregular shaft lines of black; scapulars and lesser wing coverts heavily marked with black, edged broadly with buff to white; wing coverts otherwise like back; wings dusky black; secondaries edged and tipped with ochraceous-buff; 4 outer primaries with a band of white about a third of the length from the distal end; inner webs of primaries toward base, and secondaries barred with white and buff; central tail feathers gray, mottled with dusky and banded with black; others black, mottled with ochraceous-buff, with inner webs mainly white; outermost almost wholly white; throat and abdomen white; upper breast dusky, banded narrowly with buff, with an indistinct cross band of this color; lower breast and sides of abdomen buffy white, banded with dusky; center of abdomen white; under wing coverts sooty black marked with white and ochraceous-buff.

Female, band across hindneck, light spots on wings and scapulars, and lighter markings of lower surface, including band on primaries, ochraceous-buff; outer tail feathers banded like central pair.

Measurements.—Males (7 from Costa Rica and Panamá), wing 134.0-142.9 (137.8), tail 106.5-116.5 (110.9), tarsus 15.5-19.3 (17.5) mm.

Females (7 from Costa Rica and Panamá), wing 129.3-138.5 (135.3), tail 96.7-108.5 (100.7), tarsus 16.0-18.9 (17.1) mm.

Recorded on the Pacific slope, from Chiriquí (Francés), Veraguas (Chitra), Coclé (Aguadulce, Natá), Canal Zone (Corozal), and eastern Panamá (Panama City).

This small goatsucker was first reported from Panamá by Salvin (Proc. Zool. Soc. London, 1870, p. 204) from a pair received from Arcé. The skins, in the Salvin-Godman collection in the British Museum, are labeled "Chitra, Veragua" taken in 1868. Through error Salvin listed them as from "Calovévora," a mistake copied later by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1894, pp. 392-393). One in the American Museum of Natural History was taken at Francés, Chiriquí, October 26, 1905, by H. J.

Watson. A female in U. S. National Museum was collected at Natá, Coclé, January 5, 1889, by Heyde and Lux. Griscom (Amer. Mus. Nov. no. 280, 1927, p. 2) recorded 1 taken by Benson near Aguadulce. Hallinan (Auk, 1924, p. 315) secured 1 at Corozal, Canal Zone, July 28, 1907, and W. W. Brown, Jr., collected a male near Panama City, May 4, 1904. In 1963, from May 10 to 23, Storrs Olson and H. Fischer took 3 males and 2 females in Panamá near the Canal Zone boundary beyond Albrook Field. Mr. Olson kindly loaned his specimens for examination, so that their measurements are included in the statement above. Gonads in males taken May 12 and 23 were somewhat enlarged, indication of approach of the breeding season.

The race *albicauda* ranges from Costa Rica through the Pacific lowlands of Panamá, and across the Caribbean lowlands of northern Colombia, where it is recorded near the coast east to northeastern Department of Magdalena. As a species, *C. cayennensis* extends through much of Colombia and Venezuela to the Guianas and northern Brazil, including also Aruba, Curaçao, Bonaire, Margarita, Trinidad, Tobago, and Martinique.

The nest and eggs of the race *albicauda* so far as I am aware are not known. The population of Trinidad (possibly distinct from *C. c. cayennensis* of the adjacent mainland, as the subspecies *leopeltis*) according to Belcher and Smooker (Ibis, 1936, pp. 23-24) places its 2 eggs on the ground. They are described as rounded oval, with the ground color buff, marked with irregular lines of dark brown, and spots and small blotches of pinkish brown and lavender-gray. In 2 sets of 2 and 1 single egg measurements varied from 24.5-25.5 × 19.3-19.5 mm. Father Pinchon (Faun. Antill. Franç., Dec., 1963, pp. 156-157) found the race of Martinique, which he named *Caprimulgus cayennensis manati*, nesting as is usual for this species, on the bare ground. Its 2 eggs, which measured 25-26 × 19 mm., were cream colored, marked in general like those of the birds found on Trinidad.

Order APODIFORMES

Family APODIDAE: Swifts, Vencejos

This family, the true swifts, distributed worldwide in tropical lands, has a few kinds that range in the warmer season of the year to regions of temperate summers, mainly in the Northern Hemisphere. At the approach of cold weather the latter migrate to winter quarters far to the south. Swifts are birds with long, narrow wings and compact, muscular bodies, distinguished from swallows of similar form by their far more rapid, dashing flight, and by their remaining constantly in the air. To nest and to rest they enter hollow trees or other cavities, or seek cliffs where they cling with sharp claws, bodies pressed against the surface. Only in their nests do they rest prone. Their food, entirely of small insects, is captured on the wing in the gape of the widely opened mouth. They drink in similar manner by sweeping down to scoop water on quiet surfaces of ponds and streams.

Eleven of the 65 species known are found in Panamá. Three of these, the cloud swift, the Cayenne swift, and the male chestnut-collared, are readily identified in life. The others, similar in general in size and color pattern, usually may be recognized only with the bird in the hand. And then by details of color and pattern that differ so little that it is surprising to realize that they mark distinct species.

KEY TO SPECIES OF APODIDAE

1. Size large; wing 190 mm. or more.
 White-collared swift, *Streptoprocne zonaris albicincta*, p. 224
 Smaller, wing less than 140 mm. 2
2. Throat, a collar on hindneck, and spots on either side of rump clear white.
 Cayenne swift, *Panyptila cayennensis cayennensis*, p. 244
 Plumage without clear white markings..... 3
3. Rump concolor with crown and back, or nearly so..... 4
 Rump distinctly lighter colored than crown and back..... 6
4. Throat and breast alike in color, end of tail stiff but without prominent
 spines 5
 Throat slightly grayer than breast, end of tail with stiff projecting spines.
 Chimney swift, *Chaetura pelagica*, p. 228
5. Tarsus longer, more than 15 mm.; male and female uniform sooty black
 above, dark grayish brown below.
 Zimmer's swift, *Cypseloides cryptus*, p. 243
 Tarsus shorter, less than 13 mm.; male with rufous-brown collar and fore-
 neck, female usually plain.
 Chestnut-collared swift, *Cypseloides rutilus*, p. 240
6. Upper tail coverts sooty black like crown and back; rump distinctly white,
 forming a prominent band.. Band-rumped swift, *Chaetura spinicauda*, p. 235

- Upper tail coverts uniform with rump, both lighter colored than crown and back 7
7. Definitely black on breast; throat sooty brown; tail shorter, not more than 32 mm. Short-tailed swift; *Chaetura brachyura brachyura*, p. 239
Breast grayish brown to dark grayish brown; throat paler; tail 34 mm. or more 8
8. Rump and upper tail coverts distinctly gray.
Gray-rumped swift, *Chaetura cinereiventris phaeopygos*, p. 234
Rump and upper tail coverts grayish brown 9
9. Upper surface, except rump, black; throat only slightly paler than breast.
Chapman's swift, *Chaetura c. chapmani*, p. 226
Upper surface, except rump, brownish black; throat definitely paler than breast 10
10. Larger, wing more than 125 mm.; under tail coverts paler than breast.
André's swift, *Chaetura andrei meridionalis*, p. 238
Smaller, wing less than 115 mm.; under tail coverts not paler than breast.
Vaux's swift, *Chaetura vauxi*, p. 229

STREPTOPROCNE ZONARIS ALBICINCTA (Cabanis):
White-collared Swift, Vencejo Cuelliblanco

FIGURE 36

Hemiprocne albicincta Cabanis, Journ. f. Orn., vol. 10, May 1862, p. 165. (Junction of Haiama Creek and the Demerara River, Guyana.)

Largest of the swifts found in the Republic; black, with white collar.

Description.—Length 185-205 mm. Adult (sexes alike), throat, foreneck, wings, and tail sooty black; crown, back to upper tail coverts, breast and sides deeper black; a collar, broader on the foreneck, white.

Immature, feathers of lower foreneck and upper breast edged very faintly with dull white; white collar present on hindneck, but much reduced or absent across lower foreneck.

Iris dark brown; bill black; tarsus and toes slaty black; claws fuscous.

Measurements.—Males (10 from Panamá and Colombia), wing 195-202 (198.0), tail 64.3-74.2 (67.8), culmen from base 11.0-12.6 (11.8), tarsus 21.8-23.7 (22.8) mm.

Females (6 from Guatemala, Panamá, Colombia, and Venezuela), wing 193-205 (198.1), tail 62.3-73.0 (66.7), culmen from base 11.0-12.0 (11.4), tarsus 21.5-23.3 (22.2) mm.

Weight ♂ 60, ♀ 74 grams (Trinidad, Snow and Snow, Zoologica, vol. 48, 1963, p. 7); sex?, 92.5-100.5 grams, Venezuela (recorded by Charles T. Collins).

Resident. Tolerably common; seen in the sky throughout the Republic from the lowlands to the higher mountains. Isla Coiba.

In a family noted for rapid flight, this large species equals, or may surpass, any of its smaller relatives. The white-collared swifts are social, found often in bands of a dozen, and frequently in larger numbers up to a hundred or more. Their day is spent on the wing in rapid, tireless movement through the air, regularly high above the earth, and as regularly in dashing course lower when the ground is clear. Occasionally I have seen them swing down to dip the bill in the water on rivers or ponds. Those I have secured for specimens have been shot from groups that made regular passes over some open area where I could see them fall, as their momentum often carries them many meters before they strike the ground.

Circling flocks may range so high as to be mere specks in the sky. In Bocas del Toro I have noted 200 or more milling swiftly in a huge ball formation prior to a heavy rain. I have observed also that they avoid storms or fog by rapid flights toward areas where the air is clear. Rarely, when strong, steady winds swept across mountain slopes, they may hang motionless with widespread wings for a minute or more. Apparently this is a form of display as sometimes two have approached, slowly raising the wings alternately, first one and then the other. On other occasions two or three in rapid chase have come spiraling down from high in air. Flocks near at hand may utter low chattering calls. Their preference is for flight above land as I have never observed them far at sea, nor have I recorded them over off-shore islands, with the exception of Isla Coiba, in itself a large land-mass.

In western Chiriquí, where flocks circled at sunset over pasturelands, as dusk neared they swung off toward distant mountain cliffs where I supposed they spent the night. Tails and the tips of the primaries often are much worn. Snow (Zoologica, vol. 47, 1962, p. 130) records that the race *albicincta* is migratory on the island of Trinidad. He believes that "it is likely that at least on occasions they spend the night in the air, as the European Swift *Apus apus* has been found to do."

An egg in the British Museum (Natural History), received in the Salvin-Godman collection, from Frontino, Antioquia, is dull white in color, somewhat stained, and is long elliptical in form. It measures 33×22.4 mm. Regarding it Selater and Salvin (Proc. Zool. Soc. London, 1879, p. 531) quote Salmon, who collected it when resident at Medellín, as stating that this bird "makes a nest of mud and moss

in caves, or under the shelter of rocks, and lays two eggs." Another set of 2 received in the Crowley bequest is labeled only "New Granada," which in this instance should be Colombia. These 2 are dull white, without gloss; in form 1 is long elliptical, the other long oval. They measure 32.5×21.6 and 32.0×22.5 mm.

In Oaxaca and Chiapas J. Stuart Rowley and Robert T. Orr (Condor, 1965, pp. 449-456) found the allied subspecies, *Streptoprocne z. mexicana* nesting in caves behind waterfalls where the air was saturated with moisture. Nests, placed on ledges, were "composed of mud, moss, and large quantities of insect chitin rather evenly distributed through the nest structure." A shallow depression in the top

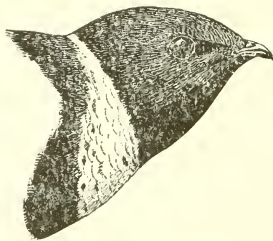


FIGURE 36.—Head of white-collared swift, vencejo cuelliblanco, *Streptoprocne zonaris albicincta*.

held the eggs, 2 in number in the complete set. The white eggs "were very soiled by wet mud." They give measurements of 33×22 mm. for 1 egg taken from the oviduct of a female collected for a specimen. In another account Rowley (Proc. West. Found. Vert. Zool., vol. 1, no. 3, 1966, p. 126) gives the range of size in eggs as $33.7-39.5 \times 22.2-23.4$ mm.

CHAETURA CHAPMANI CHAPMANI Hellmayr:

Chapman's Swift, Vencejo de Chapman

Chaetura chapmani Hellmayr, Bull. Brit. Orn. Club, vol. 19, March 30, 1907, p. 62. (Caparo, Trinidad.)

Crown, back and wings black; rump and upper tail coverts grayish brown; throat only slightly lighter than breast.

Description.—Length 115-125 mm. Adult (sexes alike), lores deep black; crown, hindneck, and back dull black; wings black glossed lightly with steel blue; outer webs of short, innermost secondaries,

rump, and upper tail coverts light grayish brown, in some with very narrow grayish white tips; tail darker brown, with black shafts; under surface dull grayish brown (darker than the rump); throat and upper foreneck slightly paler.

Iris dark brown; bill black; tarsus sooty brown (Stone, Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, p. 253).

Measurements.—Males (10 from Trinidad and San Blas), wing 117.3-123.0 (119.6), tail 37.0-42.5 (40.7), culmen from base 5.0-6.5 (5.8), tarsus 11.1-12.9 (11.7) mm.

Females (10 from Trinidad, French Guiana, and Panamá), wing 116.6-124.2 (120.2), tail 39.3-44.5 (41.3, average of 9), culmen from base 5.7-7.3 (6.3), tarsus 11.0-12.2 (12.5) mm.

Weight, 3 males 22½-26, 2 females 19½-23, 16 sex not known 21½-28 grams (data from Charles T. Collins).

Status uncertain, possibly a migrant from South America.

Two females were taken from a large flock at Gatun, Canal Zone, July 9, 1911, by L. L. Jewel. At Mandinga, San Blas, I found several flying over the Río Cangandí on January 30, 1957, and shot a pair. Others were seen high over the old airstrip on February 5. These are the only definite reports for the Republic. Records attributed to birds seen flying at Barro Colorado Island (Chapman, My Tropical Air Castle, 1929, p. 402) are not certain, as no specimens were taken.

In the air these swifts suggest Vaux's swift in outline, but when seen clearly, are appreciably larger and heavier in body. In my view of them at Mandinga as they passed overhead the wing appeared broad toward the body. The tail, which is spread constantly as they turn, was broad and fan-shaped. In general size they resemble the northern chimney swift, with weights equivalent to the 22.2 to 25.6 grams of that species.

The typical form of Chapman's swift is known mainly from specimens and observations on Trinidad. It is recorded in South America from the mouth of the Amazon (Pará and Amapá) north through the Guianas into Venezuela, where it has been taken in Amazonas and Zulía.

A slightly larger subspecies, *Chaetura chapmani viridipennis* described from Mato Grosso, is recorded from Acre, Brazil, and Antioquia in northern Colombia. The wing in 3 specimens that I have examined ranges from 127 to 128.8 mm. The supposed color difference of more greenish sheen on the wings is not constant.

The species was named for Frank M. Chapman, who collected the type and other specimens.

**CHAETURA PELAGICA (Linnaeus): Chimney Swift,
Vencejo de Chimenea**

Hirundo pelagica Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 192. (South Carolina.)

Dark grayish brown above, lighter below, with the throat paler; one of the larger species of the genus.

Description.—Length 120-134 mm. Adult (sexes alike), sooty olive above, changing to paler grayish brown on rump, upper tail coverts and tail; wings sooty black; lores deep black, in some the feathers above this area and over the eye edged very narrowly with grayish white; upper tail coverts also in some very narrowly edged with grayish white; shafts of rectrices black; throat grayish white to pale gray, merging on lower foreneck with the grayish brown of rest of the lower surface.

Measurements.—(From Ridgway, U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 718.) Males, wing 126-133 (129.2), tail 39.5-44 (42.3); exposed culmen 5.5-6 (5.6), tarsus 11.5-12.5 (11.7) mm.

Females, wing 122.5-133.5 (129.7), tail 40-45.5 (42), exposed culmen 5.5-6 (5.6), tarsus 11-12.5 (11.7) mm.

Passage migrant from the north. Recorded in southward flight in October, northward in early March, April, and May.

The chimney swift now is known to pass the northern winter in South America over the forests of the upper Amazon. It was first recorded in Panamá by Chapman (Auk, 1931, p. 120) from 2 taken by Benson at Cocoplum on the seaward side of the base of the Valiente Peninsula, on October 28, 1927. There is, however, an earlier specimen in the Museum of Comparative Zoology, collected by von Wedel on the Río Changuinola, October 24, 1926 (Peters, Bull. Mus. Comp. Zool., vol. 71, 1936, p. 314). I have 2 other fall records from Almirante, Bocas del Toro, for October 24 and 25, 1962, based on specimens secured by C. A. Quiñones, of the Gorgas Memorial Laboratory. Thomas A. Imhof at Fort Clayton, Canal Zone, noted swifts believed to be this species from their notes, (distinctly louder than those of the resident birds of the genus) from October 6 to 28, 1942.

In the flight northward Hasso von Wedel collected 2 on April 24 and 25, 1934, at Puerto Obaldía, San Blas, (Rogers, Auk, 1937, p. 392). He shot 2 more on April 12 and May 14, 1937, south of the mouth of the Río Cricamola, Bocas del Toro (Rogers, Auk, 1939, p. 82). There is also a report by Chapman (Auk, 1937, p. 392) of flocks

of swifts believed to be this species seen well at sea off Portobelo, April 18, 1937.

In my own observations, on April 22, 1949 at the Río Mamoní near Chepo, Panamá, I saw 2 small flocks and killed 1 female. This is the only specimen that I have collected, but from long familiarity with the chimney swift in the north I have recorded flocks on other occasions that I was satisfied were this species. These sight records are as follows: April 13, 1947 on the Río Jaqué, Darién, about 20 passed to the north. In 1950, at the base of Cerro Chucantí, Panamá, several flew north over our camp in early morning on March 14. Others were seen that season at Charco del Toro March 20 and 26, and at Chimán April 1. In 1952 we noted flocks over the Río Indio at Chilar, Colón, March 7 and 8, and single birds at Isla Taboga March 15.

**CHAETURA VAUXI (Townsend): Vaux's Swift,
Vencejo Oscuro Común**

FIGURE 37

Cypcelus Vauxi J. K. Townsend, Narr. Journ. Rocky Mountains, etc., 1839, p. 348. (Fort Vancouver, Washington.)

Size small; brownish black on head, back, and wings, with rump and upper tail coverts light to dark grayish brown; throat and fore-neck dull white.

Description.—Length 105-110 mm. Adult (sexes alike), crown, hindneck, back, and wings blackish brown, with a very faint greenish gloss; rump and upper tail coverts grayish brown; lores deep black; throat and foreneck light brownish gray to grayish white; rest of under surface grayish brown; under surface of wing somewhat blacker.

Immature, upper tail coverts tipped very narrowly with grayish white.

This is the most common of the small swifts in the western area of the Pacific slope of Panamá, seen regularly in rapid flight across the sky. Over the towns they course high in air. Above pasturelands and fields they often circle low, sometimes quartering like swallows barely above the ground. As they pass they utter shrill chattering calls, *chee-ee chee-ee* that have little carrying power, so that they are heard only when the birds are near at hand. The common impression of them is of their angular wings, often beating so rapidly that they seem to blur as the birds pass.

During March and April I have noted them sailing rapidly, two together, with wings held stiffly elevated to form a V over the back, part of a mating display as some of those taken at this time had the gonads definitely enlarged. Occasionally their activities over old fields were such that I believed that they were nesting in hollow trees. The salivary glands were prominent in a male taken June 3, near Soná.



FIGURE 37.—Vaux's swift, vencejo oscuro común, *Chaetura vauxi*.

Like related species, Vaux's swifts come regularly to ponds, and open stretches of quiet water on the larger streams, to drink and bathe. In the latter operation they may strike the surface rather heavily. On such occasions, as they rise and shake the feathers, drops of water may fall like rain.

Two geographic races are found in Panamá.

CHAETURA VAUXI RICHMONDI Ridgway

Chaetura richmondi Ridgway, Proc. Biol. Soc. Washington, vol. 23, April 19, 1910, p. 53. (Guayabo, Costa Rica.)

Characters.—Rump and upper tail coverts darker, definitely grayish brown, similar in color to the breast.

Measurements.—Males (8 from Guatemala, Nicaragua, Costa Rica, and Chiriquí), wing 108.7-113.8 (111.4), tail 33.4-38.1 (35.0), culmen from base 6.5-7.8 (7.2), tarsus 10.5-12.5 (11.5), mm.

Females (11 from Nicaragua, Costa Rica, and Chiriquí), wing 106.0-114.8 (111.0), tail 34.5-37.9 (36.6), culmen from base 6.5-7.8 (7.1), tarsus 10.0-11.5 (11.1) mm.

Resident. Recorded in the Subtropical Zone in western Chiriquí.

This is the race that I have found in February and March during several years at El Volcán and Cerro Punta, Chiriquí. Blake (*Fieldiana: Zool.*, vol. 36, 1958, p. 515) listed 2 males in the Mönniche collection, taken above Boquete, at Bajo Mono, November 3, 1932, and Lérída, September 21, 1936.

In my own observations, while no nests were found, the swifts displayed constantly, and those taken had the gonads enlarged, so that it was evident the breeding season was near. In the flocks that I observed daily at Palo Santo the birds frequently joined in pairs that roamed the sky in company. The group of 40 or more found here followed a regular daily pattern. Soon after sunrise they came to drink and bathe at the farm pond, and then disappeared. Sometimes they returned toward noon, but more often they came again when the sun was low. If seen at other periods during the day usually they ranged high in air.

It is possible that this race is confined in its nesting in Panamá to this mountain area where the 7 that I have collected for specimens were taken between 1,280 and 2,070 meters.

Dickinson (*Wilson Bull.*, 1951, pp. 201-202) on July 3, 1948, at a little below 2,000 meters elevation on Cerro Uyuca, central Honduras, saw a small swift enter an opening in a huge avocado tree. Two days later he had laborers cut a hole in the base of the trunk where he found the hollow center large enough to permit him to enter. The nest of the swift, placed a little more than 5 meters above ground level, was "a half cup made of short lengths of small dead twigs glued together. It was fastened to the vertical wall of the tree and measured approximately 10 by 6 cm. by 4 cm. deep." The 3 young were estimated to be about 5 days old. He collected the male parent which was identified as of the present race.

The race was named in honor of Charles W. Richmond.

Deignan (U.S. Nat. Mus. Bull. 221, March 17, 1961, p. 172) and Phillips (Anales Inst. Biol. Mex., vol. 32, 1961, publ. March 30, 1962, pp. 336-338) have brought to attention the following history of an overlooked name in the synonymy of this darker race of Vaux's swift. George N. Lawrence (Ann. New York Acad. Sci., vol. 2, March 1882, p. 246) in his discussion of a swift that he named *Chaetura gaumeri*, now recognized as *Chaetura vauxi gaumeri*, remarked that he had on loan all the material of the species in the U.S. National Museum. He noted that "among those sent me from Washington, is one specimen from Guatemala (Duenas), collected by Mr. Salvin, Feb. 6th, 1860, and labelled by him as *C. Vauxi*, also one from Mexico (Tehuantepec), collected by Prof. Sumichrast. . . . Both are a little darker than those from Yucatan, but I consider that they are the same." It appears that Lawrence had planned to name these darker birds, as he returned them to Washington with the name "*Chaetura similis* Lawr." in his handwriting on the labels. But in the end he did not carry out this intention.

Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, Jan., 1893, p. 376) in their account of *C. vauxi*, write that "Mr. Lawrence at one time referred a Dueñas specimen to his *C. gaumeri*, and associated with it an example from Tehuantepec, and these birds he seems afterwards to have discriminated under the name of *C. similis*. When due allowance is made for small individual differences in size, and for the wear and tear of the plumage, we do not think it possible to define these southern birds as distinct from the true *C. vauxi*." In a footnote these authors add "Probably the same bird is referred to by Mr. Ridgway as *C. affinis* (Pr. U.S. Nat. Mus. ix, p. 158). We have not been able to find any description of it or of *C. similis*." However, they listed "*Chaetura similis*, Lawr." under the heading *Chaetura vauxi* (*loc. cit.*, p. 375). The 2 specimens concerned, in the collections of the U.S. National Museum, both bear the name *similis*, written by Lawrence. The 1 from Guatemala has the word "Type" on the same label, written also by Lawrence. Ridgway (Proc. U.S. Nat. Mus., vol. 9, Sept. 25, 1886, p. 158) appears to have had this in mind in comments on a swift from Tlascala, México, collected by Ferrari-Pérez.

Deignan in his list of types in the U. S. National Museum includes *Chaetura similis* "Lawr.," with Salvin and Godman as authority, and as type specimen U. S. National Museum no. 30840, the specimen from Dueñas, Guatemala. He remarks that "The name *Chaetura*

similis is not adopted by the authors, but treated simply as an unnecessary synonym of *C. vauxi*. Since, however, it is associated with a reference to Lawrence and critical comments, Lawrence's *ms.* name acquires at this point nomenclatural validity."

Under an amendment to the International Code of Zoological Nomenclature, adopted in 1963, and published the following year, Article 11d on publication in synonymy now reads "A name first published as a synonym is not thereby made available unless prior to 1961 it has been treated as an available name with its original date and authorship, and either adopted as the name of a taxon or used as a senior homonym."

As Deignan's citation is dated 1961 *similis* is not available for the somewhat larger and definitely darker populations of *Chaetura vauxi* of Central America, currently recognized as *richmondi* Ridgway 1910. The race ranges from Oaxaca and Veracruz in southern México to western Panamá.

CHAETURA VAUXI OCHROPYGIA Aldrich

Chaetura vauxi ochropygia Aldrich, Scient. Publ. Cleveland Mus. Nat. Hist., vol. 7, August 31, 1937, p. 68. (Paracoté, Veraguas, Panamá.)

Characters.—Rump and upper tail coverts paler, lighter grayish brown, definitely lighter in color than the breast; average measurements slightly smaller.

A female taken on Isla Canal de Afuera, off the southern coast of Veraguas, March 21, 1962, had the iris dark brown; bill black; tarsus dull reddish brown; toes darker; claws light brown at base, dull neutral gray at tips.

Measurements.—Males (10 from Veraguas, Isla Coiba, and Isla San José), wing 107.0-111.0 (109.2), tail 33.4-36.5 (34.8), culmen from base 6.3-7.7 (7.1), tarsus 10.0-12.2 (11.3) mm.

Females (10 from Veraguas and Isla San José), wing 108.8-114.4 (110.6), tail 32.8-36.4 (34.6), culmen from base 6.9-7.7 (7.3), tarsus 10.2-12.0 (11.3) mm.

Resident. Found in the lowlands on the Pacific slope in central Panamá; islas Coiba, Canal de Afuera, San José, and Pedro González.

This race is known at present by specimens from southern Veraguas (Soná, Paracoté, Cerro Viejo), Isla Coiba, Isla Canal de Afuera, and from Isla San José and Isla Pedro González in the Archipiélago de las Perlas. It has been my impression that swifts evidently of this

species, seen regularly over Panamá City and the Pacific side of the Canal Zone, are of this race, but proof of this awaits the taking of specimens.

In 1944 I found these swifts common on Isla San José, but had some difficulty in collecting the first specimens as the birds spent most of their time circling above the forest that covered the island, where they were beyond gun range. In February and March frequently they were associated in pairs which often sailed close together with wings set at an angle above the back. From a dozen to 50 fed together, circling above the trees with rapidly beating wings. Rarely I heard them utter high-pitched chattering calls. Later, when engineers had cut broad roadways through the forest the swifts frequently came lower over these openings, so that from the middle of February to early September Dr. J. P. E. Morrison, my companion who remained on the island after my departure, secured a long series for specimens. Immature birds taken July 6 have the rump and upper tail coverts grayer, less brownish. Some specimens taken June 27 and July 4 showed molt in the wing coverts, and in 1, primaries were under renewal September 10.

Three taken on Isla Coiba January 10 and 15, 1956, are typical of this race, as are 3 secured on Isla Canal de Afuera, between Coiba and the mainland, on March 21, 1962. These individuals, all females, were near breeding stage. Other swifts of this species were recorded but not collected on adjacent Isla Afuerita March 22, and others were seen on Isla Brincanco in the Contreras group, March 24, and at Caleta Caymán, on the western end of Isla Cébaco, March 28. On Isla Coiba, from the regularity with which small groups circled around the line of coconut palms back of the beach after the sun had set, I had the impression that they sought sleeping quarters in these trees.

Small swifts have been rare on the eastern side of the Azuero Peninsula. My only sight records were at Paris, Herrera, March 4, 1948, and at Tonosí, Los Santos, March 25, 1957.

CHAETURA CINEREIVENTRIS PHAEOPYGOS Hellmayr:
Gray-rumped Swift, Vencejo de Rabadilla Gris

Chaetura cinereiventris phaeopygos Hellmayr, Bull. Brit. Orn. Club, vol. 16, May 8, 1906, p. 83. (Carillo, Costa Rica.)

A small swift, black above with gray rump and upper tail coverts.

Description.—Length 105 to 114 mm. Adult (sexes alike), above dull black, including wings and tail; rump and upper tail coverts ash gray, the feathers when in fresh plumage very narrowly tipped with

white; lores deep black; throat and upper foreneck pale gray; rest of under surface slate to slaty black; under tail coverts darker; under side of wings sooty black.

Immature, under surface including throat duller, browner.

Measurements.—Males (7 from Bocas del Toro), wing 108.3-112.6 (111.1), tail 36.5-40.3 (38.6), culmen from base 6.4-7.0 (6.7, average of 6), tarsus 11.0-12.6 (11.1, average of 6) mm.

Females (4 from Bocas del Toro), wing 109.0-113.3 (110.5), tail 34.8-39.2 (37.5), culmen from base 6.1-6.5 (6.2, average of 3), tarsus 10.7-11.0 (10.8, average of 3) mm.

Resident. Locally common in the lowlands of western Bocas del Toro.

This swift was first recorded in Panamá from a pair collected by F. H. Kennard on Western River, near Almirante on February 20, 1926. It was taken at Almirante also by Benson August 28, 1927. And in the same year Austin Paul Smith collected male and female at Sibube on the Río Sixaola, February 10. These 2 are in the Have-meyer collection in the Peabody Museum at Yale. Several in the Princeton Museum of Zoology were taken by H. von Wedel on the lower Río Cricamola on September 3, 1936, and May 1-7, 1937.

In February and March 1958, in work around Almirante Bay, I saw small swifts nearly every day, flying beyond gun range above the trees, or circling over cleared areas. Finally I learned that on days of sunshine they came down to drink and touch the water in bathing on a quiet reach of Western River above the mangroves, where the stream passed through open pasturelands. It was here that I secured 6 specimens, 1 of them an immature bird, barely grown, taken February 28.

They were found in small flocks, sometimes of 25 or 30 together, that swung swiftly across the sky, not to be distinguished from other species of the genus in flight. Rarely, when they passed low down, they appeared a bit blacker above and grayer on the rump than Vaux's swifts of similar size.

The nesting of this race has not yet been recorded, but it may be assumed that they use hollow trees, both for this purpose and for roosts. The bird is found on the Caribbean slope of Central America from Nicaragua to Bocas del Toro.

**CHAETURA SPINICAUDA (Temminck): Band-rumped Swift,
Vencejo de Rabadilla Blanquecina**

Cypselus spinicaudus Temminck, Table Méth., Planch. Col., 1839, p. 78.
(Cayenne.)

Small, with distinctly grayish white rump.

Description.—Length 110-115 mm. Adult (sexes alike), upper surface, including wings, tail, and upper tail coverts glossy, faintly bluish, black; rump pale grayish white, shading to pale gray on lower back, the shafts of the feathers black; throat and foreneck grayish white; side of head, neck, and chest deep mouse gray, changing to blackish slate on breast, sides, and abdomen; under tail coverts and under surface of wings slate-black.

Immature, somewhat duller, less glossy above; slightly more fuscous-black below.

This species is widely distributed in Panamá, throughout the Pacific slope, and from the Canal Zone eastward on the Caribbean side. When it passes low and near at hand the pale rump is often visible, a mark that distinguishes it from other species of the genus. It is thus the only one for which sight records may be accepted as fairly certain.

Two geographic races distinguished by slight differences in size are found in Panamá.

CHAETURA SPINICAUDA FUMOSA Salvin

Chaetura fumosa Salvin, Proc. Zool. Soc. London, Nov., 1870, p. 204. (Bugaba, Chiriquí.)

Characters.—Larger, wing 107.5-115.4 mm.

Measurements.—Males (13 specimens from Costa Rica and Chiriquí), wing 107.7-115.4 (109.8), tail 37.7-42.2 (39.4), culmen from base 4.8-5.5 (5.1), tarsus 9.8-11.8 (10.6) mm.

Females (9 from Costa Rica), wing 107.5-113.4 (109.8), tail 36.8-41.5 (39.8), culmen from base 4.6-6.0 (5.3), tarsus 9.6-11.6 (10.5) mm.

Rare. Status uncertain; known in Panamá only from Bugaba, the type locality, and Puerto Armuelles in western Chiriquí.

In March 1966, in the area known as Oliva near the coast north of Puerto Armuelles, Chiriquí, occasionally in early morning a flock of a dozen small swifts circled briefly over the trees. On March 3 they came within range so that I was able to secure a male that identified them as of this race. The only others that I have examined from Panamá are 4 in the British Museum (Natural History) collected by Enrique Arcé, and marked 1870. Salvin, in his original description, gives a diagnosis of characters in Latin, with the following measurements and locality "long. tota 4.5, alae 4.1, caudae 1.75. Hab. Bugaba (Arcé)." Two of the 4 skins are labeled Bugaba. The other 2 bear only the locality "Veragua." When I examined these birds I found

that the right wing in 1 (Arcé no. 3328) measured 109.0 mm., while the left wing was considerably worn at the tip so that it was only 103 mm. This latter measurement corresponds to the 4.1 inches given by Salvin, the other wing being equal to about 4.5 inches. The wing length in the other Bugaba specimen is 109.5 mm. or slightly more than 4.5 inches. Hellmayr (Verh. Orn. Ges. Bayern, vol. 8, 1908, p. 161), therefore, was correct in his selection of the bird with one wing defective as the type.

The 2 marked from "Veragua," both males, have wing lengths of 108.0 and 108.5 mm. It is possible that Arcé collected them at the type locality for like the 2 from Bugaba they are dated 1870.

The main range of the race *fumosa* is in the tropical lowlands of the Pacific slope of southwestern Costa Rica from the valley of the Río Térraba south to the head of Golfo Dulce.

CHAETURA SPINICAUDA AETHERODROMA Wetmore

Chaetura spinicauda aetherodroma Wetmore, Smithsonian Misc. Coll., vol. 117, no. 2, Sept. 25, 1951, p. 2. (Chepo, Panamá.)

Characters.—Similar to *Chaetura s. fumosa* but smaller, wing 100.2-107.0 mm.

A male, taken March 2, 1961, near the Candelaria Hydrographic Station, on the Río Pequení, Province of Panamá, had the iris wood brown; bill black; tarsus and toes dark neutral gray; claws black. A female, collected February 26, 1964, on Cerro Malí, Darién, had the iris brown; bill black; tarsus and toes dull purplish gray; claws black.

Measurements.—Males (20 from Panamá and Colombia), wing 100.2-107.0 (103.5), tail 36.3-41.8 (38.9), culmen from base 4.9-6.2 (5.4), tarsus 10.0-11.7 (10.6) mm.

Females (13 from Panamá and Colombia), wing 100.3-105.8 (103.1), tail 34.6-41.3 (39.3), culmen from base 5.1-5.9 (5.5), tarsus 10.5-11.8 (11.0) mm.

Resident. Locally common from the Canal Zone east through Darién and San Blas to Colombia, mainly in the lowlands, but ascending in feeding to 1,450 meters in the mountains (Cerro Tacarcuna).

It is probable that a single bird (sight record) noted near La Campana at the base of Cerro Campana, March 9, 1951, and several seen March 30 in the same year, in the open valley at El Valle, Coclé, were this race, but as none were collected this is not certain.

Specimen records are as follows—Canal Zone: Gamboa, Gatun. Panamá (eastern sector): Chepo, Río Pequení at the Candelaria Hy-

drographic Station, Charco del Toro. Darién: Cana, Boca de Paya, Río Tacarcuna, Cerro Malí, Jaqué. San Blas: Mandinga, Permé, Armila, Puerto Obaldía.

The small, spine-tailed swifts seen so frequently in Panamá are a constant puzzle in identification. In the eastern half of the country it is always pleasing, as one circles past, to have it turn so as to show the light, whitish rump of the present species, a mark that is duplicated in none of the others. Often I have found them in bands of 20 or more, occasionally in groups of double that number. In Darién and San Blas these flocks, identified when the pale rump is seen through binoculars, range regularly above the forests. Occasionally they have come lower down over clearings or along rivers where it has been possible to shoot one or two for specimens. When the flocks have mingled with *Chaetura vauxi* the banded swifts appear slightly smaller, with narrower wings. Usually also the body seems more tapered, as they hold the tail feathers folded. Their flight is fast but frequently more direct for longer distances, with fewer abrupt, erratic turns. Their notes, heard somewhat indistinctly, are low and chattering. Occasionally I have heard a higher pitched call, but also in a low tone that did not carry far.

The nesting season seems to come at the end of February and in early March as some of the birds taken then have been in breeding condition. On several occasions I have seen them join high in the air, and remain with feet clasped while they fell nearly to the ground. A fully grown immature bird was taken at Charco del Toro, March 28.

Above Boca de Paya on the Río Tuira I found one open stretch of quiet water where they came to drink. Goldman (in a manuscript note) noted them drinking from a ditch of the Darién Gold Mining Company near Cana. Once during a rainstorm I watched several flying slowly, evidently drinking and undoubtedly also bathing in the downpour. They appear to come to water less often than the Vaux swifts.

The only reference that I have seen to nesting in this species relates to Trinidad where Snow (Zoologica, vol. 47, 1962, p. 134) during July found a pair feeding young in a natural cavity in a tree 10 meters from the ground. He also noted 1 roosting with short-tailed swifts in a manhole in a cement drain in an abandoned wartime camp.

CHAETURA ANDREI MERIDIONALIS Hellmayr:
André's Swift, Vencejo de André

Chaetura andrei meridionalis Hellmayr, Bull. Brit. Orn. Club, vol. 19, March 30, 1907, p. 63. (Santiago del Estero, Argentina.)

Larger, like the chimney swift, but with rump and upper tail coverts grayish brown, definitely paler than the back.

Description.—Length 115-122 mm. Adult (sexes alike), crown, hindneck, back and inner secondaries fuscous-brown to fuscous-black; rump and upper tail coverts grayish brown; in some tipped very narrowly with grayish white; wings dull black, with a faint bluish sheen; lores deep black; stiff feathers over loreal area edged narrowly with grayish white; throat light brownish gray; breast, abdomen, and sides sooty brown to very dark grayish brown; under tail coverts grayish brown slightly darker than the rump.

Iris dark brown, bill black; tarsus and toes black.

Measurements.—Males (7 from Argentina, Paraguay, and Brazil), wing 125.7-129.7 (127.5), tail 33.8-38.7 (36.6), culmen from base 5.0-6.5 (5.7), tarsus 10.5-13.3 (11.7) mm.

Females (11 from Argentina, Paraguay, Brazil, Venezuela, and Colombia), wing 126.1-139.6 (131.7), tail 34.7-39.8 (37.4), culmen from base 5.1-7.1 (6.2), tarsus 10.0-12.8 (11.6) mm.

Status uncertain. Probably a winter season migrant from South America.

The only record is a female in the Princeton Museum of Zoology, collected near Juan Díaz, Panamá, August 4, 1923. The bird was shot from a flock (Rogers, Auk, 1939, p. 82). As this is the race that is reported to nest from eastern and southern Brazil to the Paraguayan Chaco and northern Argentina, this northern record is believed to be that of a migrant from the south. As further indication of migration a female of this race in the U. S. National Museum was collected at Cartagena, Bolívar, in northern Colombia, on August 27, 1942, by M. A. Carriker, Jr.

The species was named for E. André of Trinidad.

CHAETURA BRACHYURA BRACHYURA (Jardine):

Short-tailed Swift, Vencejo Rabón

Acanthylis brachyura Jardine, Ann. Mag. Nat. Hist., vol. 18, August 1846, p. 120. (Tobago.)

Small; dull black, with brownish black throat and brownish gray rump, upper and under tail coverts and tail.

Description.—Length 100 to 115 mm. Tail short, less than 30 mm. Adult (sexes alike), crown, side of head, hindneck, upper back and wings black, with a faint sheen of greenish blue; rump, upper tail coverts and tail grayish brown; shafts of rectrices black; lower back shading from sooty brown to brownish gray, in transition from black

on upper back to grayish brown on rump; throat and upper foreneck sooty brown; under tail coverts grayish brown, somewhat darker than the rump; rest of under surface dull black.

Measurements.—Males (7 from Trinidad, Colombia, and Panamá), wing 115.6-119.9 (118.1), tail 28.3-29.4 (28.6), culmen from base 5.4-6.5 (5.9) tarsus 11.0-11.8 (11.3) mm.

Females (5 from Trinidad and Guyana), wing 119.0-120.6 (119.8), tail 27.5-29.8 (28.8), culmen from base 5.1-6.1 (5.7), tarsus 11.0-11.6 (11.3) mm.

Weight, 15.5-22.0 (18.3) grams (data from Charles T. Collins).

Rare. Possibly of accidental occurrence.

The only record is of a male, found dead at Corozal, Canal Zone, September 12, 1960, by Dr. Nathan Gale. The specimen is in the U. S. National Museum.

The race is known mainly from Trinidad, Venezuela, and the Guianas, with few records from Colombia.

Snow (Zoologica, 1962, pp. 131-134, 139) in Trinidad, found this species placing its nest on the walls of sea caves, and also in chimneys, in a nest-box on the trunk of a tree, and in the manholes of a drainage system in an abandoned military camp. The normal set was of 3 to 5 eggs, with 1 set that held 6. The nest was a shallow cup made of small twigs, cemented together by a mucous secretion from the mouth of the bird, attached to the wall of the sheltering cavity. The young, like chimney swifts, climb out of the nest while still unfeathered, and cling to the wall nearby. A set of 5 eggs in the British Museum collected on Nelson Island, Port of Spain, Trinidad, are long oval to oval, dull white without gloss. Measurements are 18.1-19.1 × 12.8-13.1 mm.

Outside the nesting season the birds roost in holes often with several individuals clumped together.

**CYPSELOIDES RUTILUS (Vieillot): Chestnut-collared Swift,
Vencejo Cuellicastaño**

Hirundo rutila Vieillot, Nouv. Dict. Hist. Nat., Nouv. éd. vol. 14, September 1817, p. 528. (Guiana.)

Medium size; rump sooty black, like the back; male with rufous-brown collar; female usually plain, but some marked like the male.

Description.—Length 122-135 mm. Tail with very short projecting spines. Male, lores deep black; crown, back to upper tail coverts, wings and tail sooty black; a broad collar of cinnamon-rufous around

the neck, extended forward on the cheeks; upper throat (in the birds seen from Panamá), breast and rest of lower surface brownish black.

Female, commonly without the cinnamon-rufous collar; otherwise like the male; the collar when present usually reduced in extent and duller in color.

Measurements.—Males (9 from Guatemala, Costa Rica, Panamá, and Colombia), wing 120.6-129.0 (125.1), tail 43.5-48.9 (45.4), culmen from base 6.8-7.9 (7.3), tarsus 11.3-12.7 (11.8) mm.

Females (10 from México, Guatemala, Costa Rica, and Colombia), wing 120.0-127.5 (123.6), tail 41.2-44.1 (43.2), culmen from base 7.1-8.6 (7.7), tarsus 11.4-12.8 (12.1) mm.

Weight, males 19.25-22.25 (20.6) grams; females 17.75-24.25 (19.6) grams. (Data from Charles T. Collins; records from *C. r. rutilus* made in Trinidad.)

Status uncertain. Known from Chiriquí and Los Santos (Cerro Hoya).

The first published report of this swift in Panamá is by Hartert (Cat. Birds Brit. Mus., vol. 16, 1892, p. 494) who lists 2 males in the Salvin-Godman collection from "Chiriquí (Arcé)." Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1894, p. 378) record it from "Chiriquí, Calovevora (Arcé)." The Calovévora locality, which is in Veraguas, appears to be in error as the only specimens in the Salvin-Godman collection in the British Museum (Natural History) are the 2 labeled "Chiriquí, 1870, Arcé." listed by Hartert. The reference cited is the only basis for including Veraguas in the known range in Panamá.

There are 2 other specimen records. A male was captured February 24, 1962, by Charles O. Handley, Jr., at 1,200 meters elevation, on Cerro Hoya, Los Santos, in a mist net set across a stream "just after dark." A female was taken in the same manner at dawn on February 26, and preserved in formalin. The male is peculiar in having the front of the tarsus heavily feathered throughout its length. The feathering in most specimens is confined to the proximal end, while in an occasional bird it extends for approximately half the length on the front and sides.

Eugene Eisenmann informs me that on February 21, 1960, at El Salto above Boquete, 20 or more of a large number of swifts that circled below him as he stood at the summit of a cliff showed the conspicuous rufous collar of this species.

In one locality in Oaxaca, México, Rowley and Orr (Proc. West. Found. Vert. Zool., vol. 1, no. 3, 1966, pp. 131-132, figs. 13-14)

found chestnut-collared swifts nesting in caves in the months of May and June. In another area, in a narrow, steep-walled canyon traversed by a mountain stream, single pairs had placed their nests on the cliffs on small ledges protected above by overhanging rock. Nests in caves were rather flimsy, one being only 62 mm. high. Those outside were more substantial, the largest being 168 mm. tall. They were built of mud and moss, those in exposed locations rising cone-shaped from the base. The depth of the cup was about 12 mm. The eggs were white, somewhat stained from the nest materials. One shown in a photograph (*loc. cit.*, fig. 15) is subelliptical in form. Size range was $21.9\text{--}24.2 \times 15.0\text{--}15.4$ mm. While 2 eggs constituted a set, it was usual to find several others lying below, apparently knocked accidentally from the rather shallow nests.

The nest of the typical form *C. r. rutilus* in Trinidad is described by Snow (*Zoologica*, vol. 47, 1962, p. 135) as "a substantial bracket, semicircular in horizontal section, with a shallow depression for the eggs. It is made of various plant fibres, usually including some moss, and is fixed, presumably with saliva, onto a smooth rock-face or wall, a few feet above water." Other nesting locations were in sea-caves, and in culverts. Nests were repaired and used in successive years. Two eggs, white in color, form the normal set. Belcher and Smooker (*Ibis*, 1936, p. 26) report measurements in 3 sets as $22.0\text{--}22.9 \times 14.0\text{--}15.0$ mm.

The chestnut-collared swift has been included only under the specific name because of present uncertainty as to the status of the races that have been described from Central America. Dr. Allan Phillips in recent studies (*Anal. Inst. Biol. México*, vol. 32, 1961 = March 30, 1962, pp. 333-335) in which he has examined pertinent specimens, has found that in México these birds appear to be present only during the presumed breeding period. In Morelos and Nayarit there is no record of them between early August and early May. In Chiapas they have been found between February 18 and October 2 but not later. Dr. Phillips recognizes a paler race, *Cypseloides rutilus brunneitorques* (Lafresnaye), as nesting in the mountains of México northwest of the Isthmus of Tehuantepec with *C. r. griseifrons* described by Nelson from Nayarit as a synonym. A darker population which he lists as *C. r. nubicola* (Brodkorb) is found in Chiapas and ranges from there to Bolivia. But, as stated, these seem not to be resident in México. It is suggested that both forms leave México to winter in South America. On this basis it is presumed that both would pass through Panamá. As this problem had not been raised when I examined the

2 Chiriquí specimens in the British Museum I am not certain of their color. I may say only that the male collected by Handley on Cerro Hoya, Los Santos, is dark so that apparently it is *nubicola*.

**CYPSELOIDES CRYPTUS Zimmer: Zimmer's Swift,
Vencejo de Zimmer**

Cypseloides cryptus Zimmer, Auk, vol. 62, no. 4, October 19, 1945, p. 588.
(Inca Mine, Río Tavara, Perú.)

Of medium size; plain sooty brown, some with a white chin spot.

Description.—Length 135-146 mm. Adult, sooty black above; lores deep black; feathers on side of forehead and above loreal area more or less edged with grayish white; under surface dark grayish brown; some individuals with a white chin spot (possibly found only in adult males).

Immature, feathers on anterior edge of wing, abdomen, and under tail coverts tipped narrowly with grayish white.

Measurements.—Males (5 from British Honduras, Colombia, and Perú), wing 131.0-140.0 (134.6), tail 41.5-52.0 (45.5), culmen from base 8.5-10.1 (8.9), tarsus 16.0-17.1 (16.3, average of 4) mm.

Females (7 from British Honduras, Costa Rica, Panamá, and Venezuela), wing 129.0-138.5 (132.7), tail 42.0-48.5 (45.1), culmen from base 7.2-9.2 (8.5), tarsus 15.4-17.1 (16.3) mm.

Weight, 35.8, 40.2 grams (Beebe, Zoologica, Vol. 34, 1949, p. 60).

Status uncertain. Two records known from Panamá.

A male taken at Armila, San Blas, July 4, 1932, by Hasso von Wedel, was recorded originally by Rogers (Auk, 1939, p. 83) under the name *Cypseloides fumigatus*. In October 1961, I examined an immature female from the collections of the Los Angeles County Museum, submitted for verification by K. E. Stager, that had been collected by James R. Northern at Bahía Hermosa, Isla Coiba, on March 23, 1957. Mr. Stager informed me that the bird was shot from a mixed flock that also contained the smaller *Chaetura vauxi ochropygia*.

This little-known bird was confused with *Cypseloides fumigatus* and *C. niger* until recognized by Zimmer in the reference cited under the name at the head of the present account. It is known at present by specimens from widely scattered localities in British Honduras, Nicaragua, Costa Rica, Panamá, Colombia, Venezuela, Guyana, and Perú. As there are no breeding records at present some of the birds recorded are presumed to have been migrants or wanderers.

PANYPTILA CAYENNENSIS CAYENNENSIS (Gmelin):
Cayenne Swift, Vencejo Gargantiblanco

FIGURE 38

Hirundo cayennensis Gmelin, Syst. Nat., vol. 1, pt. 2, 1789, p. 1024. (Cayenne.)

A small swift with white throat, collar, and flanks; tail deeply forked.

Description.—Length 122-130 mm. Tarsus and toes feathered. Adult (sexes alike), 2 spots on either side of forehead, throat, foreneck, a narrow collar around the hindneck and a spot on flanks clear white; a narrow line around nape, above white collar, light mouse brown; inner primaries and secondaries edged narrowly with mouse brown, and tipped with white; rest of plumage deep black.

Measurements.—Males (11 from Nicaragua, Panamá, Ecuador, Guyana, and Cayenne), wing 116.5-122.4 (119.0), tail 52.4-58.8 (55.3), culmen from base 6.0-8.4 (7.0) mm.

Females (17 from Nicaragua, Panamá, Colombia, Trinidad and Guyana), wing 116.3-124.6 (119.1), tail 52.0-59.3 (56.4), culmen from base 5.8-8.4 (7.1), tarsus 8.0-9.8 (9.0) mm.

Weight 15.75-23.5 grams (data from Charles T. Collins, recorded in Trinidad.)

Resident. Tolerably common, ranging widely throughout the Republic from the lowlands to the lower edge of the Subtropical Zone.

The Cayenne swift is elusive as it feeds high in air, over forest or open country indifferently. Most of the present records are from the Canal Zone and adjacent areas in the Province of Panamá. The birds appear at intervals over Barro Colorado Island, and I have recorded them occasionally at Juan Mina. On March 28, 1955, at the base of Cerro Chame, Panamá, I saw a nest attached to a tree trunk about 15 meters from the ground. Other nests were noted in forest near Utivé at the base of Cerro Azul, March 25, 1949, and on the slopes of Cerro Caribunco, Panamá, April 14 of the same year. Armaguedón Hartmann found a nest in November 1960, in his coffee finca at 1,250 meters above Santa Clara, Chiriquí. The only other report at present for this province is of a pair that I noted at Puerto Armuelles, February 13, 1966. Griscom (Amer. Mus. Nov., no. 282, 1927, p. 4) saw 1 at Cabo Garachiné, Darién, February 25, 1927, the only report from eastern Panamá.

Like some other swifts this species in the Canal Zone has accepted the buildings erected by man as suitable shelter. Dr. Herbert Clark of the Gorgas Memorial Laboratory showed Greenway (Auk, 1934, p. 377) nests suspended from the ceilings of the piazzas in the hos-

pital at Ancon with the information that he had noted them first in 1931. At this same period the birds began to build on the walls of the canal locks and in the control house at Pedro Miguel. In 1936 J. A. Griswold, Jr., collected a series of the birds at the Miraflores and Pedro Miguel locks. In Panamá, on March 15, 1944, Dr. Clark

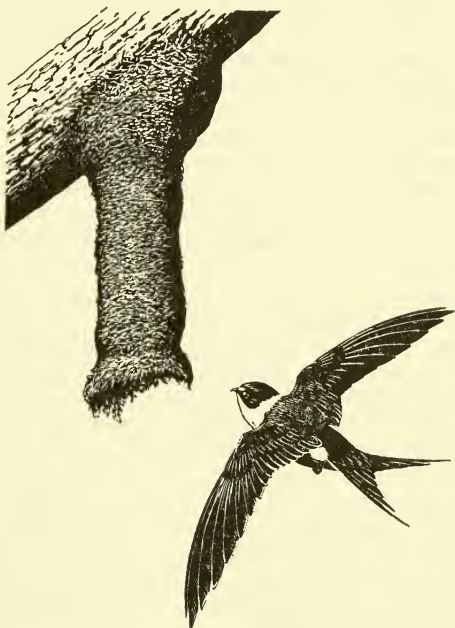


FIGURE 38.—Cayenne swift, vencejo gargantiblanco, *Panyptila cayennensis* *cayennensis*.

showed me a nest pendant from the ceiling of the two-story covered entrance at the Gorgas Memorial Laboratory, a site that has been occupied annually to the date of the present publication. Other nests have been observed on the ruins at Panamá Viejo. In March 1949, I saw 1 in a high window embrasure on the end of the church in the plaza in Chepo, where I have recorded it subsequently as still present whenever I have passed that way. The earliest record is by Salvin

(Biol. Centr.-Amer., Aves, vol. 2, 1893, p. 370) who "was shown by Mr. Lawrence in 1874 a specimen with its nest found near the Chagres River by Dr. T. K. Merritt."

The nest itself is an interesting and unusual structure made of plant downs cemented together in the form of a tube from 25 centimeters to more than half a meter in length, and 12 to 15 centimeters broad. The lower end is open. In the forests this structure is attached to the underside of a sloping tree trunk, or beneath a large limb, below the tree crown and above the undergrowth so that the birds may fly to it freely. Usually the nest swings free, though if the support has only a slight angle from the perpendicular the side may be attached rather loosely to the trunk or limb. Newly made nests that serve as sleeping quarters are smooth-walled cylinders. In the nesting season the swifts use the the same plant materials to make a compacted, cupped ledge on the inside, toward the upper end, to hold the eggs. To enter, the birds fly rapidly into the open end and then scramble up the inside.

The materials used are mainly brown and white, felted rather firmly, apparently through application of the secretion of the mouth glands of the bird. Sick (Auk, 1958, p. 218) in Brazil records numerous small feathers mixed with the plant down. As I have noted from year to year at the Gorgas Laboratory site, nests may suffer damage and loss of part of the length. Repairs and replacement are made as required on the original base. Belcher and Smooker (Ibis, 1936, p. 28) in Trinidad found that a nest used for several seasons might have as many as 4 cups to contain the eggs, placed one above the other. The eggs are white with faint gloss. Two sets of 3 each, collected May 15, 1943, and March 16, 1944, at Fort Sherman, Canal Zone, by Major General G. Ralph Meyer, were from nests suspended under a beam in a covered way in one of the officers' quarters. One set is definitely long elliptical in form. The 3 eggs measure as follows: 19.6×12.6 , 20.1×12.7 , and 20.4×12.9 mm. The other has the eggs somewhat more elongated, with the sizes as follows: 20.0×12.1 , 21.5×12.0 , and 21.5×12.1 mm.

The nesting season in Panamá appears to range from March to August. The swifts are believed to sleep in the nests throughout the year.

The normal flight of this species is high in the air, regularly 80 to 100 meters above the ground, often higher. Usually, they are not recognized as they are small. If check is made with binoculars occasionally one may be identified through a flash of white from the

throat, or as one wheels the tail, normally closed, may be spread to reveal the deep fork. The call is a low chatter.

Because of the height at which they fly few specimens are taken by shooting. At Juan Mina on the Río Chagres I have fired at them at long range, but my only specimen did not fall immediately. When found the following day it had been eaten by ants and so was kept for a skeleton.

This is the principal species known as the *Macuá*. The birds, captured by the countryman at their nests, are split half way through the body with knife or machete and are flattened and dried in the sun. Flesh and bone, powdered and mixed in perfume, have high repute among the superstitious as a love charm.

The typical race *P. c. cayennensis* ranges widely from Chiapas south through Panamá to Brazil. Moore (Proc. Biol. Soc. Washington, vol. 60, Dec. 31, 1947, p. 143) found that a male from Presidio, Veracruz, the first recorded from México, was larger (wing 126.8 mm), and named it *Panyptila cayennensis veraecrucis*.

Family TROCHILIDAE: Hummingbirds, Colibríes

This interesting family of birds, known only in the Americas, is distributed from Alaska to Tierra del Fuego, with the greatest concentration among its 320 species found in the northern half of South America. In Panamá 54 species have been recorded, 1 of them migrant from the north, the others resident on the Isthmus, though some shift about with changes in the seasons.

The plumage in most has an iridescent metallic sheen, with males usually more highly colored than females. Dimensions vary from a few no larger than a big wasp to others equal in body size to small warblers. All, regardless of bulk, are aggressive, driving fearlessly at birds of any size that pass, in addition to constant bickering with other species of the family. Most feed regularly at flowers, both on nectar and on the small insects found in them. When small flies gather in dancing multitudes in the air, various hummers circle tirelessly among them seizing them on the wing.

In nesting season males of some species have dashing displays to attract the females. Others gather in scattered groups in thickets and trees to sing squeaky, chattering songs. Females alone build the nests, incubate the 2 small white eggs, and feed the young.

Method of flight in this family is peculiar in that the main movement comes at the shoulder, with the wing as a whole rotated through an angle of 180° in what has been termed flagging flight, instead of the

usual flexible motion of open and closed wing of other flying birds. This allows controlled movement in all directions, including backward flight, without changing the direction or position of the body, not possible in other birds.

One curious structural feature is the location of the syrinx on the neck outside the body cavity, with the two long bronchi leading down into the thorax to the lungs. Though this peculiarity was described by William MacGillivray in 1839 in Audubon's *Ornithological Biography*, it has been little noticed in accounts of the family.

The family Trochilidae has long been united as a separate suborder in the Order Apodiformes, which also includes the swifts; however, as detailed information in the families Apodidae and Trochilidae increases, it seems probable that structural and behavioral differences eventually will serve to place these two groups in separate orders.

KEY TO SPECIES OF TROCHILIDAE

1. Bill strongly curved, sickle-shaped. Sicklebill, *Eutoxeres aquila salvini*, p. 276
- Bill straight or slightly curved, not sickle-shaped. 2
2. Under surface, including sides, pure white from chin to under tail coverts (throat faintly spotted with pale gray in immature individuals). Violet-crowned fairy, *Heliothryx barroti*, p. 364
- Under surface of body not entirely pure white, or if white centrally with sides spotted prominently with metallic green. 3
3. Under surface grayish white heavily streaked with dusky from throat to abdomen. Tooth-billed hummingbird, *Androdon aequatorialis*, p. 254
- Under surface not uniformly streaked. 4
4. Outer tail feathers extensively white. 5
- Outer tail feathers with white, if present, restricted to base or tips. 9
5. Very large, wing more than 73 mm.; bill heavy, strongly curved; white on outer tail feathers covering more than one-third of distal end. Violet saberwing, *Campylopterus hemileucurus mellitus*, p. 285
- Small, wing not more than 70 mm.; bill slender, straight or nearly so. 6
6. A white band across hindneck; all of outer tail feathers white except for narrow dark tip. White-necked Jacobin, *Florisuga mellivora mellivora*, male, p. 287
- No white band on hindneck. 7
7. Secondaries plain, like primaries; tail white, tipped rather broadly with black. White-tailed emerald, *Elvira chionura*, p. 340
- Secondaries spotted prominently with cinnamon-rufous; this marking less definite in females. 8
8. Larger, wing in males (under surface of body green) more than 57 mm.; in females (under surface of body whitish) 54 mm. or more. Stripe-tailed hummingbird, *Eupherusa eximia egregia*, p. 338
- Smaller, wing in males (breast black) not more than 51 mm.; in females (under surface of body grayish white) not more than 47 mm. Black-bellied hummingbird, *Eupherusa nigriventris*, p. 339

9. Bill relatively long, more than half as long as wing. 10
 Bill relatively short, less than half as long as wing. 19
10. Bill definitely curved, the basal half or more of mandible yellow or orange. 11
 Bill straight, or nearly so, entirely black. 17
11. Tail very long; the central pair of feathers greatly elongated, twice as long as the outer pair. 12
 Tail of normal length; square, or, if graduated, the central feathers not conspicuously elongated. 15
12. Small, wing not more than 40 mm.
 Little hermit, *Phaethornis longuemareus*, p. 273
 Large, wing more than 50 mm. 13
13. Darker gray on lower surface; above metallic bluish green.
 Green hermit, *Phaethornis guy coruscus*, p. 263
 Brighter colored, buffy gray on lower surface; above dull metallic bronze-green. 14
14. Upper tail coverts cinnamon, barred with dull black.
 Long-tailed hermit, *Phaethornis superciliosus*, p. 266
 Upper tail coverts dull metallic bronze-green, edged with buff.
 Black-cheeked hermit, *Phaethornis anthophilus*, p. 270
15. Base of tail white; chin dull black.
 Rucker's hermit, *Threnetes ruckeri*, p. 260
 Base of tail cinnamon-rufous; chin not black. 16
16. Hindneck to central tail feathers metallic green, varying in some to slightly bronze.....Hairy hermit, *Glaucis hirsuta affinis*, p. 257
 Hindneck to upper tail coverts strongly bronze-green to coppery bronze.
 Bronzy hermit, *Glaucis aenea aenea*, p. 255
17. Bill very slender; upper tail coverts blue.
 Green-fronted lancebill, *Doryfera ludoviciae*, p. 279
 Bill strong and heavy; upper tail coverts green or bronze. 18
18. Larger, wing 68 to 80 mm.; male with crown purple, throat greenish blue; female with under surface brownish gray.
 Rivoli's hummingbird, *Eugenes fulgens spectabilis*, p. 359
 Smaller, wing 57 to 63 mm. Male, crown greenish blue; throat reddish purple. Female, crown green like back, upper throat black.
 Long-billed star-throat, *Helimaster longirostris longirostris*, p. 366
19. Under tail coverts definitely specialized; broadened and elongated, or with those in the center thickened, stiffened, curved and elongated... 20
 Under tail coverts normal, not specialized. 23
20. Larger species, wing more than 60 mm.; under tail coverts prominently broadened and elongated. 21
 Smaller species, wing less than 55 mm.; central under tail coverts somewhat elongated, much thickened, stiffened and curved. 22
21. Bill black; under tail coverts white, long and broad, more than half as long as tail.....Black-billed plumeleeter, *Chalybura buffonii micans*, p. 344
 Basal half or more of mandible yellow-orange; under tail coverts prominent but smaller, less than half as long as tail; in male white, in female grayish white.....Bronze-tailed plumeleeter, *Chalybura urochrysis*, p. 346

22. Base of tail chestnut; secondaries dusky black, like rest of wing.
 Goldman's hummingbird, *Goldmania violiceps*, p. 320
 Base of tail broadly buff to cinnamon-buff; inner secondaries cinnamon-buff at base, forming a distinct spot.
 Pirre hummingbird *Goethalsia bella*, p. 322
23. Small; with a distinct white or buff band across the rump. 24
 Small to large; without a light-colored rump band. 26
24. Tail feathers distinctly narrowed and elongated, with undersurface of shafts white.....Green thorntail, *Popelairia conversii*, p. 302
 Tail feathers of usual broadened form. 25
25. Breast and sides metallic green; crown prominently cinnamon-buff.
 Rufous-crested coquette, *Lophornis delattri lessoni*, p. 298
 Breast and sides cinnamon-buff; crown and crest in male pure white; in female sooty to green....Adorable coquette, *Lophornis adorabilis*, p. 300
26. Foreneck, upper breast and sides entirely metallic green; lower breast and abdomen pure white.
 Snowy-breasted hummingbird, *Amazilia edward*, p. 327
 Lower surface not as above. 27
27. Both upper and underside of entire tail glittering golden-green to bronze-green.....Blue-throated goldentail, *Hylocharis eliciae earina*, p. 318
 Tail not uniformly colored as above. 28
28. Base, or all, of tail buff, cinnamon-buff, rufous, or reddish purple. 29
 Base, or all, of tail green or blue. 42
29. Small, wing less than 45 mm. 30
 Larger, wing more than 50 mm. 37
30. Throat with a glittering colored gorget (adult males). 31
 Throat finely spotted or plain (adult female, immature male). 34
31. Throat (gorget) metallic grayish green to dull purplish gray.
 Volcano hummingbird, *Selasphorus flammula torridus*, adult male, p. 373
 Throat (gorget) glittering orange-red, or purple-red. 32
32. Throat (gorget) glittering orange-red; very small, wing less than 36 mm.
 Scintillant hummingbird, *Selasphorus scintilla*, adult male, p. 377
 Throat (gorget) deep red (purple-red); larger, wing 39 mm. or more.. 33
33. Gorget with lower margin elongated laterally; smaller, tail shorter, less than 30 mm.
 Glow-throated hummingbird, *Selasphorus ardens*, adult male, p. 375
 Gorget with lower margin rounded, not elongated laterally; tail longer, more than 31 mm.
- Costa Rican wood-star, *Philodice bryantae*, adult male, p. 369
34. Throat plain, without spots (except in young males as scattered feathers of the brilliant adult gorget begin to appear). 35
 Throat finely and uniformly spotted. 36
35. Throat cinnamon-buff like sides of abdomen; tail shorter, less than 17 mm.
 Gorgetted wood-star, *Acestrura heliodor heliodor*, female and immature male, p. 372
 Throat white to pale buff, definitely paler than sides; tail longer, more than 20 mm.
 Costa Rican wood-star, *Philodice bryantae*, female and immature male, p. 369

36. Smaller, wing less than 39 mm.; tail more extensively buff.
 Scintillant hummingbird, *Selasphorus scintilla*, female and
 immature male, p. 377
 Larger, wing more than 40 mm.; tail less extensively buff, central feathers
 mainly or wholly green.
 Volcano hummingbird, *Selasphorus flammula torridus*, female
 and immature male, p. 373
37. Central rectrices mainly or wholly rufous-brown, like rest of tail. 38
 Central rectrices wholly or mainly metallic green. 39
38. Smaller, wing not more than 61 mm., tail not more than 35 mm.
 Rieffer's hummingbird, *Amazilia tzacatl tzacatl*, p. 333
 Larger, wing 67 mm., tail 40 mm. or more.
 Escudo hummingbird, *Amazilia handleyi*, p. 336
39. Foreneck and breast black or green, without white (adult males). 40
 Foreneck and breast dark centrally, bordered on either side with
 white (females and immature males). 41
40. Throat, center of breast, and abdomen black.
 Black-throated mango, *Anthracothorax nigricollis*, adult male, p. 294
 Breast and lower foreneck metallic green (upper foreneck cen-
 trally black in some individuals).
 Prévost's mango, *Anthracothorax prevostii veraguensis*, adult male, p. 292
41. Median stripe on lower surface entirely black.
 Black-throated mango, *Anthracothorax nigricollis*, female
 and immature male, p. 294
 Median stripe on lower surface partly or wholly metallic blue. Prévost's
 mango, *Anthracothorax prevostii veraguensis*, female and
 immature male, p. 292
42. Wing 56 mm. or less; of more, with prominent white tibial tufts. 43
 Wing 61 mm. or more; tibial tufts, if present, small. 60
43. Upper tail coverts and lower rump feathers bright coppery brown,
 in strong contrast to green of back; white tibial and femoral tufts greatly
 enlarged. Green puff-leg, *Haplophaedia aureliae*, p. 361
 Upper tail coverts and lower rump feathers green, bronze-green, or reddish
 purple (not bright coppery brown). 44
44. Base of tail white or grayish white; size very small (male with
 crown white) Snow-cap, *Microchera albocoronata albocoronata*, p. 342
 Base of tail not white or grayish white. 45
45. Central tail feathers and rest of tail mainly blackish to deep blue. 46
 Central tail feathers, and usually rest of tail basally or
 wholly green, bronze-green, or bronze. 49
46. Rectrices of slender form (very narrow), size small.
 Gorgetted wood-star, *Acestrura heliodor heliodor*, adult male, p. 372
 Rectrices of normal form; size, small to medium. 47
47. Tail deeply forked, more than 35 mm. long.
 Fork-tailed woodnymph, *Thalurania furcata*, adult male, p. 306
 Tail not forked, or if slightly forked less than 30 mm. long. 48
48. Bill entirely black; under surface in adult male glittering green;
 in female and young male dull white, with a small white spot behind eye.
 Allied emerald, *Chlorostilbon assimilis*, p. 303

- Mandible yellow to orange-yellow except for black tip; adult male with foreneck green, rest of under surface blue; female and young male dull white below, without white spot behind eye.
- Violet-bellied hummingbird, *Damophila julie panamensis*, p. 312
49. With crown glittering light green or blue, in contrast with
dull green back. 50
Crown and back uniform metallic green. 52
50. Crown shining deep blue, hindneck and back metallic green.
Violet-crowned hummingbird, *Klais guimeti merrittii*, adult male, p. 296
Crown glittering light green, hindneck and back dull metallic
green. 51
51. Bill shorter, culmen 17.5-20.3 mm.; middle rectrices purplish bronze.
Lovely hummingbird, *Amazilia amabilis*, adult male, p. 325
Bill longer, culmen 21.5-25.7 mm.; middle rectrices greenish bronze.
Charming hummingbird, *Amazilia decora*, adult male, p. 323
52. Foreneck with a gorget of glittering orange-red, or entirely
deep shining blue. 53
Foreneck white or grayish white, plain, or spotted with dusky,
dull green or dull greenish blue. 54
53. Foreneck with a gorget of glittering orange-red.
Ruby-throated hummingbird, *Archilochus colubris*, adult male, p. 370
Foreneck and upper breast deep shining blue.
Sapphire-throated hummingbird, *Lepidopyga coeruleogularis*
coeruleogularis, adult male, p. 315
54. Foreneck white or light gray, without markings. 55
Foreneck heavily spotted. 58
55. Breast, abdomen and under tail coverts clear white; a somewhat
indefinite breast band of dull green.
Sapphire-throated hummingbird, *Lepidopyga coeruleogularis*
coeruleogularis, female and immature male, p. 315
Without a green breastband. 56
56. Bill short, culmen less than 16 mm.
Violet-crowned hummingbird, *Klais guimeti merrittii*, female
and immature male, p. 296
Bill longer, culmen 17.0-23.6 mm. 57
57. Upper surface bronze-green, breast and abdomen whiter; smaller; wing
less than 46 mm.
Ruby-throated hummingbird, *Archilochus colubris*, female, p. 370
Upper surface metallic glittering green; breast and abdomen gray to
grayish white; wing 48.0-50.9 mm.
Fork-tailed woodnymph, *Thalurania furcata*, female and immature
male, p. 306
58. Smaller, wing less than 46.0 mm.; throat finely spotted with dusky.
Ruby-throated hummingbird, *Archilochus colubris*, immature
male, p. 370
Larger, wing more than 48.0 mm.; throat heavily spotted with metallic
green to greenish blue. 59
59. Bill shorter, culmen 19.0-20.3 mm.; middle rectrices purplish bronze.

Lovely hummingbird, *Amazilia amabilis*, female and immature male, p. 325
Bill longer, culmen 22.5-25.7 mm.; middle rectrices greenish bronze.

Charming hummingbird, *Amazilia decora*, female and immature male, p. 323

60. Entire tail dull bronze, definitely paler than green of back; under surface clear white centrally from lower foreneck through abdomen.

White-bellied mountain-gem, *Lampornis hemileucus*, p. 349

Tail darker, green or dark blue, bronze markings if present confined to central pair; lower surface in most varicolored; if mainly white, spotted with green across breast. 61

61. A definite band of dark blue on cheeks. 62

Without a blue band on cheeks. 63

62. Body plumage, above and below, dark metallic green.

Green violet-ear, *Colibri thalassinus cabanidis*, p. 291

Body plumage grayish brown to olive; rump feathers edged with cinnamon.

Brown violet-ear, *Colibri delphinae delphinae*, p. 289

63. Entire crown, including forehead, bright glittering green or blue, distinctly different from back. 64

Forecrown dull blue, rest dull green; or entire crown dull green like back. 66

64. Crown and center of breast shining dark blue.

Fiery-throated hummingbird, *Panterpe insignis*, p. 310

Crown and breast shining metallic green. 65

65. Large; nasal operculum completely feathered; a glittering blue spot on throat; chin shining metallic green like breast.

Green-crowned brilliant, *Heliodoxa jacula*, p. 357

Of medium size; anterior end of nasal operculum bare; a large gorget, extending over chin, white or purple.

Variable mountain-gem, *Lampornis castaneoventris*, adult male, p. 350

66. Bill black; under surface cinnamon-buff, without markings; or metallic green, mottled on breast and foreneck with white. 67

Bill particolored, basal half of mandible orange to red. 69

67. Under surface cinnamon-buff from chin to abdomen.

Variable mountain-gem, *Lampornis castaneoventris*, female, p. 350

Under surface metallic green mottled with white, light gray, or dull buff. 68

68. Tail metallic green, banded subterminally with bluish black; cheeks grayish brown; throat feathers green edged with white to produce a squamate pattern.

White-necked Jacobin, *Florisuga mellivora mellivora*, immature, p. 287

Only the central pairs of rectrices green, rest of tail bluish black; cheeks green; foreneck white with many large spots of metallic green.

Green-crowned brilliant, *Heliodoxa jacula*, female and immature male, p. 357

69. Size large, wing 66-75, tail more than 40 mm.; lower breast and abdomen dull cinnamon buff; under tail coverts dark centrally.

Cuvier's hummingbird, *Phaeochroa curvierii*, p. 282

Size medium, wing 58-64, tail 31-36 mm.; center of breast, abdomen and under tail coverts white.

Blue-headed sapphire, *Hylocharis grayi humboldtii*, p. 319

ANDRODON AEQUATORIALIS Gould: Tooth-billed Hummingbird,
Colibrí Piquidentado

Androdon aequatorialis Gould, Ann. Mag. Nat. Hist., ser. 3, vol. 12, 1863, p. 247. (Ecuador.)

Bill nearly as long as head, neck, and body, dentate on cutting edge of maxilla and mandible for distal half or less, strongly so near the tip; foreneck and breast dull white streaked heavily with dull black.

Description.—Length 125-145 mm. Male, crown metallic reddish copper, changing to dull sooty brown on the forehead; back and wing coverts shining green; lower rump pure white, bordered above by a narrow indefinite band like the crown; upper tail coverts distally dull greenish blue, with the concealed base dull gray; wings dull black, with a slight sheen of greenish blue, the inner webs with a faint coppery tint; base of tail light grayish green, banded broadly with bluish green at the end, and tipped narrowly with white; side of head and under surface grayish white, streaked broadly with dull black; sides and under wing coverts brownish gray; a wash of dull pink on the posterior flanks; under tail coverts dull white spotted heavily with dull black.

Female, with the reddish copper on the crown duller and the under surface less heavily streaked.

Immature, with the nape and crown shining greenish blue; coppery band on rump absent or reduced.

On the label of male and female specimens in the British Museum, collected on the Río Blanco, below Mindo, Ecuador, Walter Goodfellow noted the following colors: iris black; bill dingy yellow at base, elsewhere black; feet pale yellow.

Measurements.—Males (10 from Darién and Colombia), wing 64.1-68.4 (66.5), tail 38.8-43.9 (40.9), culmen from base 38.7-42.1 (40.2) mm.

Females (5 from Darién and Colombia), wing 62.0-64.3 (63.1), tail 37.4-41.0 (38.9), culmen from base 37.7-40.2 (38.9) mm.

Resident. In the Subtropical Zone on the mountains of Darién. Recorded from Cerro Sapo, Cerro Pirre, and Cerro Tacarcuna.

The first records for this species in Panamá were 3 males and a female taken by E. A. Goldman, April 22 and 23, and May 1, 1912, at about 1,580 meters near the head of Río Limón on Cerro Pirre. Bond and de Schauensee (Acad. Nat. Sci. Philadelphia, Monogr. no. 6, 1944, p. 29) record another collected March 29, 1938, by Oliver Pearson in the same area. They also list a male taken on Cerro Sapo, above Garachiné, May 3, 1941, by Dawson Feathers while on the

George Vanderbilt Expedition. On May 26, 1963, Pedro Galindo secured a female at La Laguna on the slopes of Cerro Tacarcuna.

The 2 from Cerro Tacarcuna in the American Museum of Natural History listed by Griscom (Bull. Mus. Comp. Zool., vol. 78, 1935, p. 319), collected by H. E. Anthony April 11 and 17, 1915, were taken near the head of the Río Cutí, Chocó, on the Colombian slopes of the mountain.

The minute serrations on the cutting edge of the bill, present on one-third to one-half of the distal end, in males that I have examined are longer, more slender, and more acutely pointed than in females, and slant to the rear at an angle of 45 degrees. Those toward the tip usually are larger so that they are easily visible to the unaided eye. In adult females the dentations have shorter, more rounded points that project at right angles to the cutting edge. A lens with low magnification is necessary to observe them in detail. The use for these structures is not known to me.

GLAUCIS AENEA AENEA Lawrence: Bronzy Hermit, Ermitaño
Bronceado

Glauis aeneus Lawrence, Proc. Acad. Nat. Sci. Philadelphia, December 1867 (March 10, 1868), p. 232. (Costa Rica.)

A small hermit hummer, with the base of the rounded tail chestnut; back coppery bronze; axillars and under tail coverts cinnamon.

Description.—Length 105-110 mm. Male, crown dusky; rest of upper surface coppery bronze, in some with a greenish cast; upper tail coverts tipped with cinnamon; wings dusky with a faint violet sheen; middle rectrices bronze-green, with a narrow subterminal bar of black and a white tip; others rufous, with a broad subterminal black band and white tip; chin whitish; rest of underparts, including under wing coverts, axillars, and under tail coverts rusty cinnamon; distinct spot behind eye cinnamon; broad band back of eye black.

Female, under surface more uniform, and brighter rusty cinnamon.

Immature, greater wing coverts and secondaries tipped very narrowly with dull buff.

Iris very dark brown; maxilla black; tip of mandible dusky, rest dull reddish brown; tarsus and toes cinnamon (like the color of the under tail coverts); claws black.

Measurements.—Males (13 from Nicaragua, Costa Rica, and Panamá), wing 52.9-56.4 (54.5), tail 30.0-33.3 (31.8), culmen from base 29.4-32.6 (31.3) mm.

Females (10 from Nicaragua, Costa Rica, and Panamá), wing

50.1-53.3 (51.7), tail 29.8-31.9 (31.1), culmen from base 29.6-32.5 (31.1) mm.

Resident. Found locally in the Tropical Zone; recorded on the Pacific slope from western Chiriquí to western Veraguas, and on the Caribbean side in Bocas del Toro.

This interesting species has been little known in Panamá as few were taken by the early collectors, so far as records show. The first were 2, in the Rothschild collection, taken by H. J. Watson at Bugaba, Chiriquí, October 3 and 27, 1903. The first report of breeding is by Worth (Auk, 1939, p. 307) who, in an account of a nest of a thrush found June 26, 1937, on the Río Garaché, Chiriquí, remarked that one of these hummingbirds "was incubating its two eggs nearby." In a more detailed account later, Worth (Auk, 1942, pp. 367-368) reported that this hummingbird was "very common in banana groves of the Río Garaché region in Chiriquí," a locality about 15 kilometers west of Concepción. He described the nest as attached to an inch-wide strip split from an old banana leaf, held in place by downy plant fibers and spider webs that encircled the pendant leaf section. "On this foundation the nest cup is erected, rather high (that is close to the midrib). It is large and deep, being very loosely built of rootlets, so that the eggs may be seen through the structure from below. . . . The nest is both secure and waterproof, for it is protected by the main blade of the leaf overhead. . . . The eggs, which are laid in June and July, were invariably two in number, measuring 15×9 and 16×9 mm. in one case." The young were fed by regurgitation in usual hummer fashion.

Among more recent records, on June 9, 1953, I secured a male in a tract of forest at Zapotillo west of Soná in western Veraguas, the most eastern record yet known. Near Almirante, Bocas del Toro, January 20, 1958, I shot a handsome male as it perched over water at the border of a mangrove swamp, and on February 26 collected another above Garay Creek in the same area. Another male taken at Almirante on February 16, 1961, is in the Gorgas Memorial Laboratory in Panamá. Others in the American Museum of Natural History were collected in this area April 9, 1963, and October 17 and 18, 1965. In February and March 1966 I found *aenea* fairly common on the northern end of the Burica Peninsula, Chiriquí, where it ranged in low trees and shrubbery bordering old fields toward the seacoast at Olivo, and inland along the Río San Bartolo, near the Costa Rican boundary.

While the current treatment of *aenea* has been to place it as a race of *Glaucis hirsuta* allied to *G. h. affinis*, after detailed study I believe

that it is specifically distinct. Male and female in *aenea* are closely similar in color and pattern, with the axillars and under tail coverts cinnamon like the rest of the under surface; they are smaller, and in both the mandible is dark in color. They differ also in being more bronze-green above, and in having a definite cinnamon spot behind the eye. In *Glaucis hirsuta*, in the three allied races, typical *hirsuta*, *insularum*, and *affinis*, the female is distinctly brighter colored than males, more cinnamon-rufous on the lower surface, with this color fairly uniform on the foreneck, breast, and sides. Males are darker below, especially on the sides. In both the mandible is clearly light in color, being honey yellow, and the under tail coverts are more or less dull gray to grayish brown centrally, bordered with white. The spot behind the eye is duller and indistinct. In Panamá from specimens now available there is a definite gap in the range of *aenea* and *G. h. affinis*, on the Pacific side from immediately west of the Canal Zone to central Veraguas, and on the Caribbean slope from western Colón to Bocas del Toro.

The present species appears again in western Colombia where it is recorded from northern Valle (Punto Muchimbo on the Río San Juan), south through Cauca and Nariño to northwestern Ecuador (Esmeraldas, Carondelet, Pambilar, San Javier). This population, widely separated from the nominate race, differs in slightly smaller average size and in faintly brighter color on the breast and sides. Measurements are as follows:

Males (10 from Colombia and Ecuador), wing 48.2-53.1 (51.5), tail 28.8-33.5 (30.3), culmen from base 30.0-31.6 (30.8) mm.

Females (2 from Ecuador), wing 50.2-51.5 (50.8), tail 29.7, 29.7, culmen from base 30.3-31.5 (30.9) mm.

While the differences are slight, the form may be recognized as *Glaucis aenea columbiana* Boucard from the Río Dagua, Valle, Colombia, described as *Glaucis columbiana* by Boucard in his *Genera of Humming Birds*, December 1895, page 402.

GLAUCIS HIRSUTA AFFINIS Lawrence: Hairy Hermit, Ermitaño Pechicanelo

Glaucis affinis Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 6, 1858, p. 261. (Upper Río Napo, Ecuador.)

Similar in tail form and marking to *Glaucis aenea*, but larger, with back iridescent green; under tail coverts dull cinnamon-buff to dull white with darker centers.

Description.—Length 115-124 mm. Male, above including wing

coverts and the two middle rectrices metallic green to greenish bronze, changing to dusky on the forecrown; upper tail coverts edged with grayish white to pale cinnamon; lateral rectrices chestnut, with a terminal band of dull black and a white tip; wings dusky with a faint violet sheen; chin white; foreneck, breast, and sides dull russet; abdomen paler; axillars and under tail coverts pale dull cinnamon-buff to gray centrally edged with dull white; anterior under wing coverts and line of edge of wing russet.

Female, brighter russet below especially on the side of the neck and breast.

Immature, feathers of dorsal surface more bronze-green, tipped with dull buff; sides of breast greenish bronze tipped lightly with buff extending along sides of neck; throat with a V-shaped mark of blackish slate; chin dull white.

A male, taken at Armila, San Blas, March 11, 1963, had the iris dark brown; a thin line along the side of the maxilla extending from the nostril, below the culmen, to the middle of this part of the bill dull cinnamon-buff; rest of maxilla and tip of mandible black; rest of mandible and gape honey yellow; tarsus light brown; toes more buff; claws black.

A female, shot at Juan Mina, Canal Zone, January 12, 1955, had the bare nostrils, maxilla, and the tip of the mandible fuscous; rest of mandible and tongue light honey yellow; tarsus flesh color; toes honey yellow; claws black. When the bill was closed the yellow side of the mandible was enclosed completely within the maxilla, so that only on the gonys was the yellow color visible.

Measurements.—Males (10 from Panamá), wing 58.4-64.0 (60.8), tail 36.6-40.8 (38.4), culmen from base 31.8-33.4 (32.8) mm.

Females (10 from Panamá), wing 53.8-57.3 (55.0), tail 33.2-35.8 (34.1), culmen from base 31.0-34.0 (32.6) mm.

Weight, 1 male, 6.95 grams; 5 females 6.13 ± 0.32 grams (Hartman, Auk, 1954, p. 468).

Resident. In the Tropical Zone on the Pacific slope from the Canal Zone (Tabernilla, Corozal), and on the Atlantic slope from the Caribbean side of Coclé (El Uracillo) and western Colón (Chilar, on the lower Río Indio) eastward to the Colombian boundary in Darién (El Real, Boca de Paya) and San Blas (Mandinga, Armila, Puerto Obaldía).

A hummingbird of this size and general color pattern that I saw December 23, 1955, in a tract of forest on Isla Taboga may have been this species.

In the eastern half of Panamá the hairy hermit is one of the common hummingbirds in the lowlands. On the Caribbean slope it is found west to the valley of the Río Indio, and probably extends around the shores of Gatun Lake, as it is found on Barro Colorado Island. I encountered it also above Madden Lake on the Río Boquerón and the Río Pequení. Beyond the eastern boundary of the Republic it ranges through much of Colombia and western Venezuela, and extends south to eastern Ecuador and Perú.

The hairy hermit usually lives alone, low near the ground in forest and second growth, rarely among higher branches. When perched the bird often vibrates the tail, partly spread to show the white tip and basal colors. The general resemblance to the long-tailed hermits in form of bill and action is close, especially when the end of the tail is not visible. As I have moved through undergrowth they have come regularly to peer and hover before me, attracted often by the round openings in the end of the barrels of my gun. They range commonly in banana plantations, and in thickets of false banana. Most of their feeding is by gleaning the branches of small shrubs, and the flowers of *Heliconia*. Stomachs that I have examined have held spiders, with fragments of diptera, and other small insects.

In the Canal Zone this hummingbird is recorded as breeding from the end of April to late July. Nests attached to the underside of leaves of palms are found regularly in the abundant smaller kinds armed heavily with spines, that grow in close groups amid the dark undergrowth of heavy forest. A nest collected by E. A. Goldman near Gatun on May 2, 1911, hung perpendicularly from the underside of a single leaflet. His notes describe the structure as "composed of hairlike vegetable fibers, with a few leaf fragments and small lichens interwoven, the lining being of hairlike material." The nest measured about 250 mm. long by 50 mm. in diameter, with the cavity for the eggs 40 mm. broad by 20 mm. deep. The 2 eggs are long subelliptical, but with both ends bluntly rounded. They measure 15.3×8.9 and 15.8×9.0 mm. Notes given to me by Major General G. Ralph Meyer describe several nests, one with 2 fresh eggs, found in the Forest Reserve on Madden Road, July 20 and 23, 1941. These were made of a coarse fiber, with some of the strands brought around the leaf and secured there with spider web. The structure was firm, but so loosely woven that the outline of the eggs was visible from the side or from below. The outer rim was constricted so that the external diameter of the opening was less than that within the cavity. A mass of lichens and bits of leaf was secured to the palm leaf above, and a similar mass

hung like a beard below. A typical nest had an external diameter of 50 mm., with the cavity 40 mm. across by 25 mm. deep. The single egg, with one side broken, that came to the U. S. National Museum in his collection, measures 16.3×9.0 mm. In form it resembles those collected by Goldman. Jewel (in Stone, Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, p. 254) gives the measurements of a set of 2 taken May 7, near Gatun, as ".35 \times .61 and .34 \times .62 in." (equivalent to 15.4×8.9 and 15.7×8.6 mm.)

A nest in the Royal Ontario Museum in Toronto, collected by O. D. Boggs, December 13, 1945, at El Centro in northwestern Santander, Colombia, was fastened to the underside of a palm leaf. Attached to the deep cup of fine filaments, there is an elongated pendant train of small dried leaves, the whole bound by filaments of spider web.

THRENETES RUCKERI (Bourcier): Rucker's Hermit, *Ermitaño Barbudo*

Trochilus Ruckeri Bourcier, Proc. Zool. Soc. London, pt. 15, May 1847, p. 46. (Esmeraldas, Ecuador.)

Similar to the hairy hermit, but with a black throat patch and white base on the rounded tail.

Description.—Length 110-122 mm. Adult (sexes alike), upper surface, including wing coverts and central tail feathers, bronze-green or green, darker on the crown; upper tail coverts with a narrow distal black line, tipped with buff; outer tail feathers with basal half white, broadly black distally, tipped with white; wings dusky with a faint violaceous gloss; side of head dull black bordered above and below with a line of buff or cinnamon; chin and upper throat dusky black, the feathers edged lightly with dull buff or cinnamon; lower foreneck and upper breast cinnamon-rufous, changing to pale buffy gray on breast and abdomen, with the flanks more or less cinnamon-rufous; under tail coverts bronzy green or green, margined with cinnamon; outer under wing coverts black, inner ones dark gray.

Immature, upper surface edged lightly with dull buff; cinnamon of foreneck less in amount, bordered above and below by greenish black, edged lightly with pale cinnamon.

This is a forest inhabitant that in the main ranges in or just above the undergrowth. Though the pattern of markings is distinct, the bird is so similar in form and action to the hairy hermit that the two may be confused when not seen clearly. This species at rest regularly swings the tail up and down, in the same manner as the longer tailed

hermits. The white tips of the rectrices as they move in an arc show clearly and attract the eye, though in the dim light of the undergrowth in which they live, the body of the bird may be barely visible.

Two of the four forms that are recognized are found in Panamá.

Gould (Monogr. Trochilidae, vol. 1, pt. 2, 1851, pl. 11 and text) stated that "M. Bourcier very appropriately dedicated this species to Sigismund Rucker of Wandsworth, a gentleman distinguished alike for his love of natural science and for his refined taste in the arts."

THRENETES RUCKERI VENTOSUS Bangs and Penard

Threnetes ruckeri ventosus Bangs and Penard, Occ. Papers Boston Soc. Nat. Hist., vol. 5, April 7, 1924, p. 77. (Pozo Azul, Costa Rica.)

Characters.—Upper surface bronzy green; cinnamon-brown on foreneck extending to upper breast; lower breast and abdomen somewhat paler.

A male taken near the head of the Río Guabal, on the Caribbean slope of northwestern Coclé, March 2, 1962, had the iris dark brown; maxilla and tip of mandible black; rest of mandible dull honey yellow; tarsus, toes, and claws light brown. Another male shot near Puerto Armuelles, Chiriquí, January 26, 1966, had the iris dark reddish brown; maxilla and tip of mandible black; bare skin between the mandibular rami dull yellow; side of mandibular rami dull grayish green; cutting edge, inside of mandible, and tongue dull honey yellow; toes light brownish yellow; claws black.

Measurements.—Males (10 from Panamá), wing 54.1-60.0 (56.8), tail 32.7-35.1 (34.0), culmen from base 30.4-32.9 (31.3) mm.

Females (10 from Nicaragua, Costa Rica, and Panamá), wing 52.8-58.4 (55.4), tail 30.8-35.5 (32.8), culmen from base 30.3-33.5 (31.9) mm.

Resident. Locally distributed in forested areas, mainly in the lowlands, from the Costa Rican boundary in western Chiriquí to the western sector of the Province of Panamá, and on the Caribbean slope to the valley of the Río Indio in northern Coclé.

The few reports for it on the Pacific slope include a male collected by Mrs. Davidson at Puerto Armuelles, November 14, 1929 (specimen in the California Academy of Sciences), another male that I secured in the same area January 29, 1966, and birds taken by Arcé listed by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1892, p. 316) from Bibalaz and Mina de Chorchá, Chiriquí.

On the Caribbean side this form is locally common in the forests of Bocas del Toro. Handley collected 1 (in formalin) at Sibube on

the Río Sixaola. Peters (Bull. Mus. Comp. Zool., vol. 71, 1931, p. 314) recorded them from Changuinola, Almirante, and Guabo. I secured several around Bahía Almirante in January and February 1958, and Handley secured 1 (in formalin) on Cayo Agua. One reported by Blake (Fieldiana: Zool., vol. 36, 1958, p. 515) in the Mönniche collection from "Cordillera" at "5000 feet," possibly came from lower down on the Holcomb Trail. Farther east on the Caribbean side in northwestern Coclé I shot a male at Tigre, elevation 475 meters, on the Río Guabal in the headwaters of the Río Coclé del Norte. I secured others on the Río Uracillo, a tributary of the Río Indio in northeastern Coclé, in February 1952.

Intergradation with the eastern subspecies *darienensis* is apparent in those secured at El Uracillo. These resemble *ventosus* on the lower surface, but are deeper green above.

Skutch (Auk, 1964, pp. 22-23) in observations at El General, Costa Rica, found these hummingbirds at singing posts that they occupied regularly. He writes that the song "was more tuneful and varied than those of most hummingbirds" so much so that when first heard he thought that it must have come from some wood warbler unknown to him. The songs lasted for 4 or 5 seconds and were separated by longer intervals of silence. The singing period in the main came in the first half of the rainy season.

To the north this race ranges through Costa Rica to Nicaragua, and recently has been found in the Department of Izabal in eastern Guatemala (Land and Kiff, Auk, 1965, p. 286).

THRENETES RUCKERI DARIENENSIS Bangs and Barbour

Threnetes ruckeri darienensis Bangs and Barbour, Bull. Mus. Comp. Zool., vol. 65, September 1922, p. 204. (Cerro Sapo, Darién, Panamá.)

Characters.—Upper surface shining green; cinnamon of foreneck less extensive (extending barely to the upper breast) and brighter, more rufous; gray of breast and abdomen slightly darker; under tail coverts darker green. Some show a bronzy sheen on the back, but less in amount than in *ventosus*.

A male taken February 22, 1961, on the Río Boquerón, Colón, near the Peluca Hydrographic Station, had the iris dark brown; side of base of maxilla forward to the nostril, mandible except the tip, and the bare skin between the rami honey yellow; bottom of the groove anterior to the nostril brownish yellow; rest of maxilla and tip of mandible black; bare crus, tarsus, and toes dull reddish brown; claws black.

Measurements.—Males (10 from Panamá), wing 56.3-60.4 (58.6), tail 30.3-35.2 (33.3), culmen from base 30.1-33.9 (31.9) mm.

Females (10 from Panamá and northwestern Colombia), wing 55.3-58.1 (56.8), tail 31.4-34.0 (32.9), culmen from base 31.0-33.9 (31.8) mm.

Resident. Locally common in areas of forest; found on the Pacific slope from the headwaters of the Río Pacora in the Cerro Azul east through Darién; on the Caribbean slope from the Canal Zone, near the lower Río Chagres, east through San Blas.

Most of the birds from the lower Chagres Valley appear somewhat intermediate toward the western race *ventosus* in a bronzy tint in the dorsal plumage, but agree with *darienensis* otherwise. The population while not typical is placed with the present form.

These hummingbirds range in forest, mainly in undergrowth. Stands of the abundant platanillos (*Heliconia*) are especially favored. The flowers of these plants are visited constantly as a source of food. Banana plantations where they border woodland also are favorite haunts. Males sing at intervals, when they often seem noisy, but in the main the birds are quiet. In the heavy shadows that they frequent the dim light conceals their colors so that they may be barely seen. The exception comes when they are displaying, or are excited, as then the partly spread tail is vibrated rapidly with the white tip describing a wide arc which immediately attracts the eye.

I found them especially common in the forests covering the low hills on the Quebrada Venado, back of the Cuna village Armila. Here we released them daily from mist nets set for forest birds.

PHAETHORNIS GUY CORUSCUS Bangs: Green Hermit, Ermitaño Verde

Phaethornis guy coruscus Bangs, Proc. New England Zool. Club, vol. 3, January 30, 1902, p. 26. (Boquete, 1370 meters elevation, Chiriquí.)

A large, dark-colored, long-tailed hermit with the back shining bluish green, and the rump, upper tail coverts, and base of tail deep blue.

Description.—Length 145-155 mm. Adult male, above, including most of wing coverts, bright metallic bluish green, duller on the crown; rump, upper tail coverts, and base of tail metallic blue, the longer tail coverts terminally black, with the tip white; distal half of tail black, with the short, narrowed tips of the central pair gray, tipped with white; wing, including most of primary coverts, dull black with a purplish sheen; side of head distinctly black; narrow line back of

gape, and center of upper throat tawny; under parts metallic green, more or less slate color on center of breast and abdomen; center of lower abdomen washed with tawny; under tail coverts mixed greenish blue and dusky gray, the longer feathers tipped with white.

Adult female, usually somewhat greener above; the central tail feathers with much longer, narrowed tip, which is white; lateral pairs tipped narrowly with white; a broad streak behind the eye, a broader one from the lores below the eye, the center of the throat and fore-neck, and lower abdomen ochraceous-buff; rest of under surface dark gray, more or less bluish green on the sides; under tail coverts more extensively white.

Immature, crown, hindneck, and lower back (sometimes all of the back) tipped with cinnamon; sides of neck and chest with indistinct buffy tips.

In a male, taken February 27, 1962, on the head of the Río Guabal, Coclé, the iris was very dark reddish brown; maxilla and tip of mandible black; rest of mandible deep red; tarsus and toes dusky neutral gray; claws fuscous.

A female shot April 12, 1949, on Cerro Azul, Panamá, had the iris dark brown; maxilla black; mandible reddish orange, becoming dark brown at the extreme tip; tarsus and toes dull brown; claws slightly darker. Another female, an adult bird in molt, taken on Cerro Campana, March 12, 1951, differed in that the maxilla and tip of mandible were dull brownish black, and the rest of the mandible was deep rose.

Measurements.—Males (10 from Panamá), wing 58.8-63.7 (61.7), tail 47.3-52.7 (50.5), culmen from base 41.8-44.9 (43.7) mm.

Females (10 from Panamá), wing 57.6-62.3 (59.9), tail 59.6-66.9 (63.9), culmen from base 39.6-43.0 (41.3) mm.

The males measured, all in adult plumage, have the tail definitely shorter than the females, with the attenuated tip of the middle pair of rectrices short. In adult females the narrowed, slender tip of these feathers is much longer, this accounting for the decidedly longer measurements.

Immature males, when they have attained full growth, differ from adults, as they have these tail tips elongated and formed like those of females. The length of the slender point is variable, in some as long as in adult females, in some shorter. The total length of the feather however equals that of females.

Weight, 3 males, 5.53, 5.72, 6.09 grams (Hartman, Auk, 1954, p. 468).

Resident. Locally common in the Tropical and Subtropical Zones on the Pacific slope, and in the same zones on the Caribbean side in Bocas del Toro and Coclé.

These are birds of the forests where they live in the shaded undergrowth near the ground. In areas where they are common, as on the Río Tacarcuna in Darién, they were captured in numbers in mist nets set in the undergrowth. They are common in Chiriquí to the Costa Rican boundary. Eastward they are recorded in forested areas to the slopes of Cerro Campana, and locally around Gatun Lake, including Barro Colorado Island. It is strange, therefore, that this species was not reported in that region by the early collectors. I secured 1 in thickets bordering the Ciénaga Campana near Chico, east of Pacora, my only lowland record. From Cerro Azul eastward through Cerro Sapo, Cerro Pirre, the upper Río Jaqué, and the slopes of Tacarcuna they are common. In Bocas del Toro I have specimens from the Río Changuena, and Mönniche found them on the Holcomb Trail. I secured 1 at 475 meters at Tigre on the headwaters of Río Coclé del Norte, in Coclé. Goldman took 1 on Cerro Bruja, but I did not find it in the forests of the hill country at Mandinga or in the far eastern San Blas.

In feeding they seek a variety of flowers, from those of heliconias to more open kinds, and also glean twigs and leaves in steady search. The long tail frequently is widely spread as the bird hovers or moves, when its surface appears three or four times the width of the body. In February and March, apparently the onset of the nesting season, several males may rest near one another on low perches in undergrowth a meter or so above the ground. Here they utter the steady series of sharp, chirping notes that constitute their song, often with partly spread tail in steady vibration. Frequently they dash in pursuit of some companion that comes near. The nest is described by Skutch (Auk, 1964, pp. 15-16) in Costa Rica as attached to a segment of a heliconia leaf, to which the cone-shaped structure of plant fibers is fastened by spider web. The female rests on the nest cup facing the pendant leaf to which it is attached, so that she must turn the head back until the bill tip is almost vertical. In Chiriquí, Worth (Auk, 1942, p. 367) found that the nest was suspended "at the tip of a blade of a palm leaf. Its 2 eggs are dull white in color and average 17.5×11 mm." Blake (Condor, 1956, p. 386) described a nest in the Mönniche collection as "cone-shaped and slightly flattened on one side . . . firmly attached by means of a thin network of exceedingly fine fibers to the

underside of the tip of a palm leaf which served as a roof to the cup." The 2 dull white eggs measured 17×11 , and 18×11 mm.

**PHAETHORNIS SUPERCILIOSUS (Linnaeus): Long-tailed Hermit,
Ermitaño Rabudo**

FIGURE 39

Trochilus superciliosus Linnaeus, Syst. Nat., ed. 12, vol. 1, 1760, p. 189.
(Cayenne.)

A large, long-tailed hermit, with the back light bronze-green; rump and upper tail coverts cinnamon-buff barred with black.

Description.—Length 145-155 mm. Adult (sexes alike), pileum dusky to dusky black; hindneck dull brownish buff tipped with dusky; upper back and scapulars dull metallic bronze-green edged with dusky; rump and upper tail coverts cinnamon barred with black; wing coverts dull green; wings dull black with a faint sheen of violet; tail with base dull bronze-green, distally black, edged with cinnamon-buff and tipped with white; middle pair of rectrices much elongated, and narrowed at the end, dusky at base, white for most of the narrowed tip; a broad line of buff above and back of eye; side of head, including lores black, bordered below by a faint streak of pale buff to white; chin and upper foreneck brownish buff, the feathers dusky basally, with a central line of buff to buffy white; rest of under surface grayish buff to buffy white, paler on the abdomen, with under tail coverts more decidedly buff.

Immature, upper surface with feathers tipped narrowly with cinnamon.

This is the most common of the large hermit hummingbirds found throughout the Tropical Zone of the mainland wherever there is forest cover. Heavily shaded areas where undergrowth is restricted or at least fairly open are favored localities, but they range also in open gallery forest, particularly when feeding at flowers. I have found them at times in heavy stands of low palms where the ground beneath was open. They probe regularly in flowers, but also search twigs and leaves for food. Often as they move about they utter squeaky calls, especially when excited by an intruding human. They are constantly pugnacious toward other hummers and often also toward larger birds. Once I saw one in hot pursuit of a bicolored hawk that passed in rapid flight.

These hummingbirds have much curiosity over human intrusion, so that regularly I have had them appear suddenly a meter or two distant to hover, with rapidly vibrating tails. The openings in the

muzzle of my gun have attracted them so that they have come close many times to examine them. When satisfied or alarmed they dart swiftly away and disappear. At rest, particularly when singing, the tail is vibrated rapidly up and down in a wide arc with the white tip prominent against the duller color pattern of the rest of the bird.

Nesting seems to begin in May in Panamá. Then males rest on low perches, and sing a long series of rather monotonous chirping calls, that often suggest the alarm notes of small finches. At times a number of males, all singing, gather to rest separately but fairly near one another, concealed in the undergrowth. Rowley (Proc. West. Found.



FIGURE 39.—Long-tailed hermit, ermitaño rabudo, *Phacothornis superciliosus*.

Vert. Zool., vol. 1, no. 3, 1966, p. 134, fig. 16) gives measurements of 2 eggs of the race *mexicanus* from western Oaxaca, a larger form than those of Panamá, as 16.1×9.0 and 15.1×9.8 mm.

A male of the race *cassinii* that I shot February 15, 1959, at Boca de Paya had the throat crammed with insects, among them small beetles, of a size that astonished me as one broken body, probably of a chrysomelid, measured 6 mm. A whole one of the same family, was 4 mm. long. The stomach of a specimen from Cana contained 11 small spiders. Another from Portobelo held 8 small spiders and a ball of eggs probably of the same group.

Two geographic races that differ in size, especially in length of tail, and very slightly in depth of color are recognized in the Republic. Hummingbirds of this general form are widely distributed from southern México to eastern Bolivia and Brazil, with much variation in

details of color, and to a lesser degree in pattern of markings. Many of the populations have been given names, but as yet there is no certainty as to their grouping as species. Ridgway (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, pp. 319-321) listed 4 races that he recognized between southern México and Panamá, under the specific name *longirostris*. Todd (Ann. Carnegie Mus., vol. 29, 1942, pp. 278-281) in the area from Costa Rica southward divided them among 8 separate species. Peters (Check-list Birds World, vol. 5, 1945, pp. 9-10) listed 14 subspecies under the species heading *superciliosus*. Zimmer (Amer. Mus. Nov. no. 1449, 1950, pp. 17-29) separated three forms of southern Venezuela, the Guianas, and northeastern Brazil as a species *superciliosus*, and united 14 others from México to Bolivia and central Brazil under the name *malaris*. It is obvious that the problem of relationship here is complex, to be established only with many more data than are now available. It has seemed best for the present to follow Peters as a standard check-list.

PHAETHORNIS SUPERCILIOSUS CEPHALUS (Bourcier and Mulsant)

Trochilus cephalus Bourcier and Mulsant, Rev. Zool., vol. 11, September 1848, p. 269. (Río San Juan, Nicaragua.)

Phaethornis panamensis Boucard, The Humming Bird, vol. 2, pt. 9, September 1892, p. 83. (Panamá and Aguadulce.)

Characters.—Averaging slightly larger, with longer tail; paler, less definitely green on the back; crown slightly browner; rump and upper tail coverts averaging somewhat paler buffy brown.

A male taken near the Peluca Hydrographic Station on the Río Boquerón, February 23, 1961, had the iris wood brown; basal half of mandible, including the bare skin between the rami, dull reddish brown; rest of bill black; tarsus and toes fuscous; claws dusky neutral gray.

A female shot near Puerto Armuelles, Chiriquí, February 12, 1966, had the iris dark brown; maxilla black; tip of mandible dark grayish brown; rest light orange-yellow; inside of maxilla black, of mandible and the basal half of the tongue light orange-yellow; distal half of tongue dull brown; front of tarsus and toes grayish brown; back of tarsus light dull brown; claws fuscous.

Measurements.—Males (10 from Panamá), wing 60.0-64.0 (61.8), tail 63.2-67.2 (65.3), culmen from base 40.3-43.3 (41.5) mm.

Females (8 from Panamá), wing 58.6-64.2 (60.8), tail 60.1-68.8 (64.7), culmen from base 38.4-40.8 (39.2) mm.

Resident. Found locally in the lowlands on the Pacific slope in Chiriquí (Puerto Armuelles, Divalá, Bugaba, San Félix), and Veraguas (Puerto Vidal, Paracoté); common on the Caribbean slope in Bocas del Toro (Changuinola, Almirante), northern Coclé (El Uracillo), and western Colón (along the Río Indio), the lower Chagres Valley in the Canal Zone (Juan Mina, Barro Colorado Island, Gatun), above Madden Lake on the Río Pequení (Candelaria Hydrographic Station) and the Río Boquerón (Peluca Hydrographic Station), and in the eastern sector of Colón (Portobelo).

Specimens from Bocas del Toro, northern Coclé, and western Colón are slightly darker above so that Zimmer (*loc. cit.*, p. 21) has listed them as the race *cassinii*. I have included them in *cephalus* as those that I have seen are not quite as dark as typical *cassinii*, while they agree in larger size, especially in longer tail, with the western population, *cephalus*.

Skutch (Auk, 1964, pp. 8-9) describes the nests of this race in Costa Rica as fastened beneath a pendant leaf of the small, spiny-trunked palms common in forest undergrowth. The cup to hold the eggs was located in the broad top attached closely against the leaf. Below, the structure tapered to end in a "thin, dangling tail, which hung free below the tip of the palm frond." One that he examined was "composed of fine rootlets, the delicate branched stems of mosses and liverworts, fibers of various kinds, and similar materials. Most of the components were stiff and wiry, making it fairly rigid and harsh to the touch. Unlike the nests of most hummingbirds, it contained no soft downy stuff." Materials of the nest were bound by cobweb, which was wound around the leaf to give support. Two nests measured 17.5 to 20 cm. long, by 5 cm. wide at the top. All were in deep shade in dense forest, placed from $1\frac{1}{2}$ to $2\frac{1}{2}$ meters from the ground. Two eggs in 1 set each measured 15.9×9.5 mm.

In the Canal Zone the nesting season extends from May to August.

This race is found beyond Panamá through Costa Rica and Nicaragua to southern Honduras.

Boucard described *Phaethornis panamensis*, listed above as a synonym of *cephalus*, from "Panama and Veragua, Colombia," and remarked in his brief discussion that "I discovered this species at Panama, January 1877. I have also some specimens collected at Agua Dulce, Veragua." The wing and tail measurements that he lists agree with those of *cephalus*.

PHAETHORNIS SUPERCILIOSUS CASSINII Lawrence

Phaethornis Cassinii Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 8, 1866, p. 347. (Turbo, Antioquia, Colombia.)

Characters.—Averaging slightly smaller with shorter tail; slightly darker, more definitely green on the back; crown slightly blacker; rump and upper tail coverts more cinnamon-buff.

A male shot at Puerto Obaldía, San Blas, February 16, 1963, had the iris dark brown; base of mandible rather light bright brown; rest of bill black; tarsus and toes brownish neutral gray; claws fuscous-black.

Measurements.—Males (10 from Darién), wing 58.1-61.2 (59.9), tail 59.0-64.4 (61.5), culmen from base 37.0-40.5 (38.8) mm.

Females (10 from eastern Panamá Province, Darién, and Chocó), wing 58.0-61.5 (59.2), tail 60.0-62.9 (61.5), culmen from base 36.8-42.0 (38.7) mm.

Weight, 1 female, 6.15 grams (Hartman, Auk, 1954, p. 468).

Resident. Locally common in the Tropical Zone in eastern Panamá in forested areas; eastern sector of Panamá Province (Cerro Azul, Chimán, Charco del Toro), Darién (Cerro Sapo, Río Chucunaque at the mouth of the Sucubtí and of the Tuquesa, Boca de Paya, to 550 meters on Cerro Pirre, Jaqué, Río Jaqué), and San Blas (Mandinga, Permé, Ranchón, Puerto Obaldía).

The records for Cerro Pirre include 2 that I collected on the upper Río Setegantí February 7, 1961, at about 450 meters, and 1 secured by Goldman near Cana at 550 meters. I regard both these points as within the upper edge of the Tropical Zone.

The male taken by the anthropologist John L. Baer at the mouth of the Río Sucubtí on April 13, 1924, was his last specimen. As the label is not in his handwriting apparently he was seriously ill at the time. He died at Aclá May 28, and was buried there "in the coral sand under a clump of coconut trees commanding a beautiful view." (Marsh, White Indians of Darien, 1934, p. 188.)

This race ranges in Colombia in the lower Atrato Basin to northern Chocó (Unguía, Acandí) and the eastern side of the Golfo de Darién in extreme northern Antioquia (Necoclí, Turbo).

PHAETHORNIS ANTHOPHILUS (Bourcier): Black-cheeked Hermit, Ermitaño Mejillinegro

A green-backed hermit, grayish white on the under surface, with streaked throat; side of head broadly black.

Description.—Length 130-140 mm. Pileum dusky to fuscous-black; back, wing coverts, and base of tail green, lightly margined with cinnamon-buff on rump and upper tail coverts; end of tail black, tipped with white, with the black in the elongated central pair changing basally to fuscous-brown, and the white on the tip extensive; wing dusky with a faint violet sheen; side of head broadly black; a broad superciliary line, varying from white to buff; foreneck, upper breast and abdomen white; throat streaked with dusky; breast grayish; flanks light buff; under tail coverts white, sometimes washed with buff.

The species is one of wide range across northern Colombia and northern Venezuela that has its northwestern limit in eastern Panamá. Two slightly differing forms are recognized in the Republic.

PHAETHORNIS ANTHOPHILUS ANTHOPHILUS (Bourcier)

Trochilus anthophilus Bourcier, Rev. Zool., vol. 6, March 1843, p. 71. (Upper Magdalena River, Colombia.)

Characters.—Distal section of elongated central rectrices narrowed to a definitely uniform width; throat more heavily streaked; averaging slightly paler green above.

A male, taken February 16, 1963, at Puerto Obaldía, San Blas, had the iris dark brown; maxilla and tip of mandible black; base of mandible bright orange-red; tarsus and toes brownish neutral gray; claws fuscous-black.

Measurements.—Males (4 from Panamá), wing 57.5-60.4 (59.0), tail 54.1-58.0 (56.5), culmen from base 33.9-37.3 (35.1) mm.

Female (1 from Panamá), wing 54.6, tail 59.6, culmen from base 33.0 mm.

Resident. Found in the Tropical Zone in the lowlands of the eastern sector of the Province of Panamá, between Pacora and the mouth of the Río Chico. Recorded at Puerto Obaldía, eastern San Blas.

This interesting hummingbird was found first on the mainland on March 18, 1949, when I collected one near Chico, Panamá. On April 3, near Pacora, Panamá, I secured another when it flew out from a hedgerow to move rapidly among scattered weeds in an open pasture. In 1961 I took a third March 22 as it fed at flowers of a robe near the Ciénaga Santo Domingo, between the La Jagua Hunting Club and the coast at Chico. Two days later several were visiting flowers of emajagua back of the beach near the mouth of the Río Chico, where another was taken. They ranged more in the open than usual for other members of the genus found in Panamá.

Near Puerto Obaldía, San Blas, February 16, 1963, I secured 1

as it rested on an open perch near a small stream, where the rapid vibration of its white-tipped tail attracted my attention. These occurrences are an extension of the range from adjacent Chocó in Colombia, where there is record of the species at Unguía.

The 5 from Panamá do not differ appreciably in color from our series from northern Colombia, or in size. The following measurements are included for comparison.

Males (10 from Chocó, Córdoba, Bolívar, Magdalena, and Tolima, Colombia), wing 57.2-60.3 (59.2), tail 52.2-57.6 (54.4), culmen from base 34.5-38.9 (36.3) mm.

Females (7 from Chocó, Bolívar, Magdalena, and Guajira, Colombia), wing 52.7-56.3 (54.7), tail 51.6-56.8 (54.0), culmen from base 31.1-35.6 (32.9) mm.

PHAETHORNIS ANTHOPHILUS HYALINUS Bangs

Phaethornis hyalinus Bangs, Auk, vol. 18, January 1901, p. 27. (Isla del Rey, Archipiélago de las Perlas, Panamá.)

Characters.—Distal end of elongated central rectrices averaging broader; throat less heavily streaked; slightly darker green above.

Measurements.—Males (6 from islas del Rey and San José), wing 56.2-61.0 (57.8), tail 53.1-58.7 (56.0), culmen from base 35.0-38.8 (36.6) mm.

Females (6 from islas del Rey, San José, and Pedro González), wing 54.2-57.6 (55.1), tail 52.4-60.0 (55.3), culmen from base 33.5-37.4 (35.1) mm.

Resident in the Archipiélago de las Perlas (recorded from Isla San José, Isla Pedro González, Isla del Rey, and Isla Cañas).

The series of 3 specimens from which this interesting race was described, taken on "San Miguel Island" (= Isla del Rey) in 1900 by W. W. Brown, Jr., was supplemented by 5 more secured by this collector in a second visit in 1904. It was recorded also from Isla Pedro González by Bond and de Schauensee (Acad. Nat. Sci. Philadelphia, Monogr. no. 6, 1944, p. 31) from the collections of the Fifth Vanderbilt Expedition, taken May 10, 1941. In 1944 J. P. E. Morrison and I collected a small series on Isla San José between March 5 and September 13. On Pedro González I saw 2 on March 11 along an open, shaded trail but failed to collect any. They decoyed readily by squeaking, but came so near, attracted by the openings in the barrels of my gun, that I could not shoot them. On San José they ranged in open areas in the forest, and along the banks of the larger streams.

January 22 and 23, 1960, I saw several on Isla Cañas, and on Janu-

ary 24 shot a male on Isla del Rey, adjacent, as it fed at flowers in a tall tree at the border of a mangrove swamp. Others were seen January 25 at Ensenada, nearby, and on January 27 along the border of a mangrove swamp near the mouth of the Río Cacique on Bahía Santelmo at the southern end of the island.

**PHAETHORNIS LONGUEMAREUS (Lesson): Little Hermít,
Ermitaño Enano**

Trochilus Longuemareus Lesson, Les Trochilidés, May 1832, p. 15, pl. 2. (Cayenne.)

A hermit hummingbird, dwarf in size, in life appearing rufous-brown.

Description.—Length 90-98 mm. Adult male, above bronzy to coppery bronze-green, darker on the crown; rump and upper tail coverts chestnut; tail with elongated central feathers dark metallic green for most of length, grayish brown at end, tipped with white; lateral tail feathers greenish black edged with cinnamon, in some tipped with white; wings dusky with a violet sheen; prominent superciliary and a rictal streak cinnamon to cinnamon-buff, with the space between on side of head dull black; foreneck and upper breast grayish cinnamon, feathers on the chin with partly concealed bases of slaty black; lower breast, abdomen, sides, and under tail coverts brighter in color, more rufous.

Female, usually paler on lower surface.

Like the larger species of the genus these are birds of the forest where they range low near the ground. Often they rest on perches elevated less than half a meter in shadows that hide them except for the light tail tip, that in its regular vibrations attracts the eye. With a curiosity equal to that of their larger companions they dart in to hover, a meter or less from the face of the observer, but at any threatening motion dash off and disappear. In pugnacious attacks on companions their wings may produce a loud humming sound. They feed at flowers, often at low jungle blossoms of small size.

While they are widely spread wherever there is a cover of trees, they are common only in the denser humid forests on the Caribbean slope, and in Darién. From Chiriquí east through the Province of Panamá they are rather rare. A few range upward to the lower edge of the Subtropical Zone.

Two subspecies are recognized in the Republic, distinguished by slight differences in depth of color.

PHAETHORNIS LONGUEMAREUS SATURATUS Ridgway

Phaethornis adolphi saturatus Ridgway, Proc. Biol. Soc. Washington, vol. 23, April 19, 1910, p. 54. (El Hogar, Costa Rica.)

Characters.—More coppery bronze, less green above; rump faintly paler; slightly paler on lower surface.

A male taken near Puerto Armuelles, Chiriquí, February 16, 1966, had the iris dark brown; maxilla and tip of mandible black; base of mandible light honey yellow; basal two-thirds of tongue light honey yellow, tip brownish white; tarsus and toes pale dull pinkish white; claws black.

Measurements.—Males (10 from Nicaragua, Costa Rica, and Panamá), wing 36.5-39.4 (38.1), tail 29.4-36.4 (32.6), culmen from base 22.9-25.6 (23.9) mm.

Females (10 from Nicaragua, Costa Rica, and Panamá), wing 36.9-40.0 (38.3), tail 32.6-36.5 (34.4), culmen from base 22.6-25.1 (23.6, average of 8) mm.

Weight, 1 female, 2.64 grams (Hartman, Auk, 1954, p. 468).

Resident. Uncommon locally on the Pacific side in forested areas in the Tropical Zone from western Chiriquí to Veraguas, Coclé, and Panamá; on the Caribbean slope in Bocas del Toro and western Colón; more common in the Canal Zone, especially on the Caribbean side; found rarely in the lower edge of the Subtropical Zone.

Birds of the Canal Zone are somewhat variable, mainly darker, and thus intermediate toward the race *subrufescens* of eastern Panamá. The few that I have seen from Bocas del Toro and western Colón also average somewhat darker.

The little hermit was first reported from the Province of Chiriquí by Mrs. Davidson (Proc. California Acad. Sci., ser. 4, vol. 23, 1938, p. 257) from a female taken near San Félix, November 29, 1931. In February 1956 I found it fairly common in that area in one small tract of forest. Farther west I have seen it occasionally from 1,200 to 1,300 meters elevation near El Volcán, Santa Clara, and Sereno (at the Costa Rican boundary). I found it also lower at 750 meters near Buena Vista, above Concepción, in the lowlands at Santa Gallo, south of Alanje, and along the upper Río Corotú and the Río San Bartolo, near the Costa Rican boundary back of Puerto Armuelles. A few were seen near Soná, in Veraguas, in May and June 1953. Salvin (Proc. Zool. Soc. London, 1867, p. 152) recorded 1 taken by Arcé at Santiago, a specimen that is now in the British Museum. In Coclé I have found it at El Valle on Cerro Gaital and Cerro Agua. In western Panamá I have seen it on Cerro Campana, and have taken it lower down on the

Río Camarón. I have 1 from near Pacora, and have found it also near Chepo.

In Bocas del Toro in 1958 these hummers ranged around Almirante Bay. In 1952 they were fairly common along the Río Indio at El Uracillo in northern Coclé, and lower down along this stream in western Colón. Though not abundant, they are seen regularly in the lower Chagres Valley in the Canal Zone.

Skutch (Ibis, 1951, pp. 180-195) has given an interesting account of this race in the humid forests of Costa Rica, where it is more common. Males assemble in scattered groups, each on a favored low perch, in forest undergrowth. Here they sing a series of notes in varying tempo, with more spirit than is heard in the monotonous repetitions of the larger species of the genus. As they call the birds elevate the bill and vibrate the tail so that the white tip describes an arc of varying length. Nests, built by the female alone, from 1 to 2 meters above the ground, are fastened to the underside of drooping leaves of the low spiny-trunked palms abundant in the forest undergrowth. They are built of a variety of fine fibrous materials and downs, mixed with bits of leaf and moss, bound with cobweb that also fastens them to the leaf support. Nest material and additional web may be added during the period of incubation. Two tiny white eggs in 1 set each measured 11.5×7.1 mm., and 2 in another nest each 11.9×7.9 mm. In Costa Rica there appear to be two nesting periods, one from the beginning of the rainy season in April to August, and another toward the end of the wet season in November to the beginning of the dry season in January. Incubating females rest invariably with breast toward the supporting leaf, which requires that the head be thrown back and the bill pointed upward.

The food of nectar and small insects is taken from flowers. Where blossoms have long, narrow corollas in which the curved bill cannot penetrate the birds may pierce the lower end of the tube and thus reach the nectar.

PHAETHORNIS LONGUEMAREUS SUBRUFESCENS Chapman

Phaethornis striigularis subrufescens Chapman, Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 283. (Barbacoas, Nariño, Colombia.)

Phaethornis adolphi fraterculus Nelson, Smithsonian Misc. Coll., vol. 60, September 27, 1912, no. 3, p. 9. (Cana, Darién, Panamá.)

Phaethornis adolphi nelsoni Bangs and Barbour, Bull. Mus. Comp. Zool., vol. 65, September 1922, p. 204. (New name for *P. a. fraterculus* Nelson, 1912, preoccupied by *Phaethornis fraterculus* Gould, 1861.)

Characters.—Darker above, more bronzy green; rufous of rump faintly darker; darker, more rufous on the under surface.

A male taken at Chimán, Panamá, February 17, 1950, had the iris dark brown; maxilla and end of mandible black; somewhat more than basal half of the mandible honey yellow; tarsus and toes light brownish white; claws fuscous.

An adult female secured at Puerto Obaldía, San Blas, February 16, 1963, differed in having the iris reddish brown, and basal half or more of the mandible bright yellow. An immature female (fully grown) collected near the Candelaria Hydrographic Station on the Río Pequení, March 11, 1961, had the iris wood brown; maxilla and end of mandible black; rest of mandible and gape light honey yellow; tarsus and toes flesh color; claws black.

Measurements.—Males (10 from eastern Panamá), wing 35.5-39.4 (37.5), tail 31.3-35.9 (32.7), culmen from base 21.7-24.0 (22.9) mm.

Females (10 from eastern Panamá and northern Chocó), wing 36.7-40.3 (38.6), tail 32.0-36.2 (32.9, average of 8), culmen from base 22.2-23.5 (22.5) mm.

Resident. Fairly common in the Tropical Zone in eastern Province of Panamá (Río Pequení, Chimán, base of Cerro Chucantí, Charco del Toro), Darién (valleys of the Río Tuira, Río Chucunaque, and Río Jaqué, Cerro Pirre to 550 meters), and San Blas (Mandinga, Armila, Puerto Obaldía).

This race extends from central Panamá through western Colombia in the lower Atrato Valley of northern Chocó (Unguía, Acandí), northwestern Antioquia (Villa Artiaga), and along the Pacific slope to western Ecuador.

In the heavier forests of eastern Panamá these hummingbirds are fairly common, though often they may be overlooked in the dark shadows of the low perches near the forest floor where they normally rest. In contrast to this usual habit occasionally they come out of the deep woodland to feed at flowers growing in the open on the banks of streams. More rarely in such excursions they join other hummingbirds at the blossoms of flowering guayabos fairly high above the ground.

EUTOXERES AQUILA SALVINI Gould: Sicklebill, Pico de Hoz

FIGURE 40

Eutoxeres Salvini Gould, Ann. Mag. Nat. Hist., ser. 4, vol. 1, no. 6, June 1868, p. 456. ("Veragua," here designated Bocas del Toro.)

Eutoxeres aquila munda Griscom, Bull. Mus. Comp. Zoöl., vol. 72, January 1932, p. 330. (Puerto Obaldía, San Blas, Panamá.)

Bill sickle-shaped; green above, white heavily streaked with black underneath.

Description.—Length 120-130 mm. Adult (sexes alike), above, including wing coverts, metallic green; feathers of crown margined with dusky; rump and upper tail coverts more or less bluish green, edged with dull buff; tail feathers dull bronzy green, brighter on the central pair, tipped with white; wings blackish slate, with a faint wash of violet; innermost secondary (in some specimens, others also) tipped lightly with white; under surface sooty black, streaked heavily with white; side of head and foreneck washed lightly with buff.

Immature, feathers of upper surface tipped more or less with buff; remiges tipped lightly with white.

A male taken on the Río Pequení, Panamá, March 5, 1961, had the



FIGURE 40.—Head of sicklebill, pico de hoz, *Eutoxeres aquila salvini*.

iris dark brown; maxilla and tip of mandible black; rest of mandible, including the inside (except for the tip which is dark), and gape yellow; scutes on front of tarsus, toes, and claws fuscous; back of tarsus purplish white.

An adult female, collected at Almirante, Bocas del Toro, February 15, 1958, had the iris dark brown; bare eyelids dull neutral gray; maxilla, tip of mandible, and line of gonys black; sides of mandible nearly to the tip, gape, inside of floor of mouth and the tongue, except for the tip, honey yellow; tip of tongue duller, browner; front of tarsus and top of toes fuscous; crus dull white; back of tarsus (which is without scales) dull purplish gray; claws dusky neutral gray.

Measurements.—Males (10 from Panamá), wing 69.7-77.4 (73.0), tail 49.0-53.1 (51.1), chord of culmen from base 25.5-27.9 (26.7) mm.

Females (12 from Panamá), wing 68.0-71.7 (69.4), tail 49.1-54.0 (51.0), chord of culmen from base 26.4-28.5 (27.5) mm.

Weight, ♂, 11 grams (recorded by George V. N. Powell).

Resident. Locally fairly common in the Tropical and lower Subtropical Zones; on the Caribbean slope found in Bocas del Toro

(Boquete Trail at 1,500 meters, Almirante, Río Changuena) ; northern Veraguas (Calovévora, Belén) ; northern Coclé (Tigre, on the head of Río Guabal) ; western Colón (Chilar, on the Río Indio) ; San Blas (Permé, Armila, Ranchón, Puerto Obaldía). On the Pacific side recorded on Cerro Campana (900 meters) in Western Province of Panamá, and in the mountains of Darién (Cerro Sapo, Cerro Pirre, Cerro Malí, La Laguna, Cerro Tacarcuna).

Salvin and Godman (Biol. Centr.-Amer., Aves., vol. 2, 1892, p. 315) include Chitra, a locality on the southern slope of the mountains in Veraguas, but I believe this may be in error, as in my examination of specimens from their collection in the British Museum I have not found any from that locality. My only certain record for the Pacific slope of western Panamá is of 1 that I saw March 11, 1960, at 800 meters in woodland on the head of the Río Escarrea, above Buena Vista, Chiriquí. An important recent record is of a female collected on Cerro Campana, July 9, 1966, by Storrs Olson. Others were taken here by G. V. N. Powell, October 30, 1966.

This is another species of heavy woodland, found usually in undergrowth in such shadows that often only the white tail tip is clearly seen. These hummingbirds decoy easily, but hover for inspection at a distance of several meters, often partly concealed beside the trunk of a tree. The legs are long and strong, and the whole body is strongly muscular. They feed regularly at the angular flowers of heliconias at which they cling, often rather awkwardly, while the curved bill is thrust into the blossoms. At other times they hover while gleaning tree trunks, usually near the ground. The tongue which extends to the end of the bill has the same curvature, so that it lies smoothly in the groove of the lower mandible.

When Gould named this bird in 1868 in honor of Osbert Salvin, with regard to locality he said only that he had 3 specimens from "Veragua." In an earlier account under the heading *Eutoxeres aquila* in his Monograph of the Trochilidae (vol. 1, November, 1851, pl. 3, with text) he said that at the time 2 specimens were "all that is known of this rare and singular Humming Bird; of these one is in the Lodigesian Collection, the other in my own. . . . My own specimen was . . . sent from Veragua in Central America by the well-known botanical collector M. Warszewicz, who, while crossing from Bocca del Toro on the Atlantic side of Panama to David on that of the Pacific, was induced to deviate in search of novelties to the Rovalo peak, where his labours were rewarded by the discovery, among other interesting objects, of this very curious bird." The old trail that crossed from the

Chiriquí Lagoon through Boquete began near the present small settlement of Róbalo, south of Punta Róbalo, near the mouth of the river of the same name. While it is improbable that the traveler came near the mountain now called Cerro Róbalo on the headwaters of the Río Changuinola to the west, it is evident that the bird was taken in the Province of Bocas del Toro, which, therefore, is cited as the type locality.

In the specimens now at hand I can see no difference between those of western Panamá and Costa Rica, and those of the eastern San Blas that Griscom separated under the subspecific name *munda*. The latter, therefore, is listed as a synonym of *salvini*.

DORYFERA LUDOVICIAE (Bourcier and Mulsant): Green-fronted Lancebill, Pico Lanza Frentiverde

FIGURE 41

Trochilus ludoviciae Bourcier and Mulsant, Ann. Sci. Phys. Nat. Agric. Ind., Soc. Roy. Agric., etc., Lyon, vol. 10, 1847, p. 136. ("Nouvelle-Grenade" = Buena Vista, 1,350 meters, Meta, Eastern Andes, above Villavicencio, designated by Chapman, Bull. Amer. Mus. Nat. Hist., vol. 36, p. 278.)

Under surface plain grayish green, with a small spot of white on the leg; bill very long and slender.

Description.—Length 110-118 mm.; bill 35.2-38.3 mm. Under a lens of low magnification the distal end of the cutting edge of both maxilla and mandible show minute serrations for a distance of about 10 mm. Male, forehead metallic green or bluish green; crown and hindneck dark coppery, or greenish bronze; back, scapulars, and rump rather dark metallic green; upper tail coverts greenish blue; wing coverts metallic green to dull black, edged with metallic green; wings slaty black, lightly glossed with purplish blue; tail feathers black, tipped, except on middle pair, with brownish gray; throat and upper foreneck dusky, or dull grayish green; under tail coverts dull blue or greenish blue; rest of under surface dull bronze-green; tibia partly white.

Female; metallic spot on forehead smaller; coloration in general duller.

Immature, forehead like the crown.

Two geographic races are found in Panamá.

The position of the present species, placed by Peters (Check-List Birds World, vol. 5, 1945, p. 3) at the beginning of the family, has been shifted to its present location in accordance with the arrangement of Augusto Ruschi (Bol. Mus. Biol. Prof. Mello Leitão, Biol.

no. 48, 1965, p. 2), based on the form of the nest. The genera *Androdon* through *Eutoxeres* in Peters' arrangement have nests attached to the under surface of leaves, like those of palms, with an elongated, trailing tail of the nest material hanging below. All other genera according to Ruschi have the usual fairly compact cup-shaped nests.

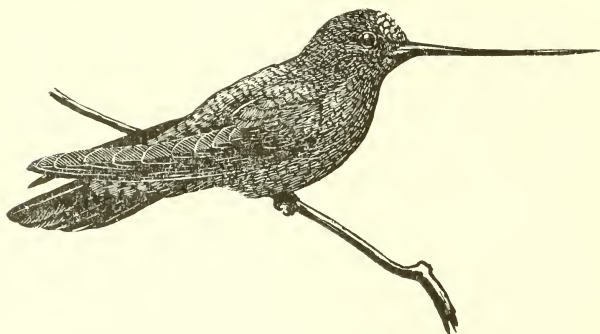


FIGURE 41.—Green-fronted lancebill, pico lanza frentiverde, *Doryfera ludovicicae*.

DORYFERA LUDOVICIAE VERAGUENSIS Salvin

Dorifera veraguensis Salvin, Proc. Zool. Soc. London, June 1867, p. 154.
(Cordillera de Tolé, Chiriquí, Panamá.)

Characters.—Darker; forehead metallic blue to bluish green; crown darker; upper tail coverts darker blue; lower surface darker, especially on the throat.

Measurements.—Males (11 from Costa Rica and western Panamá) wing 58.4-61.0 (59.3), tail 31.0-32.8 (31.7), culmen from base 34.0-37.9 (36.1) mm.

Females (5 from Costa Rica and western Panamá) wing 55.9-56.7 (56.3), tail 28.2-31.7 (30.7), culmen from base 34.8-37.8 (36.2) mm.

Resident. Apparently rare; upper Tropical Zone in Chiriquí (Volcán de Chiriquí; Cordillera de Tolé) and Veraguas (Chitra).

This form is little known in Panamá. It was named by Salvin from a single specimen taken by Arcé on the Cordillera de Tolé. He secured others later farther west that unquestionably were taken on the volcano, but marked only "Chiriquí." W. W. Brown, Jr., in 1901 collected 2 females at 2,130 and 2,280 meters above Boquete on

March 17 and April 15 (Bangs, Proc. New England Zool. Club, 1902, p. 26). A male in the American Museum of Natural History was collected by Benson at Chitra, Veraguas, on March 5, 1926, the only record to date for this province.

This form, found also in Costa Rica, ranges there on the Caribbean slope. It is possible that in Panamá it may occur also on that side of the western mountains.

DORYFERA LUDOVICIAE RECTIROSTRIS Gould

Doryfera rectirostris Gould, Monogr. Trochilidae, Intr., vol. 1, 1861, p. 56. (Nanegal, western Ecuador, designated by de Schauensee, Caldasia, vol. 5, no. 23, 1949, p. 535.)

Characters.—General color paler; forehead bright metallic green; crown lighter; upper tail coverts somewhat lighter blue; lower surface paler, especially on the throat and upper foreneck.

A male secured on Cerro Tacarcuna, Darién February 20, 1964, had the iris dark brown; bare skin above and below eye light dull blue; bill black; tarsus and toes dull brownish neutral gray; claws black.

Measurements.—Male (one from Cerro Tacarcuna), wing 57.7, tail 31.4, culmen from base 37.0 mm.

Females (3 from Cerro Tacarcuna and Cerro Pirre), wing 52.5-55.7 (54.0), tail 29.1-30.6 (29.6), culmen from base 35.6-37.9 (36.5) mm.

Resident. Apparently rare in the Subtropical Zone of the mountains of Darién.

E. A. Goldman secured 2 females April 20 and 30, 1912, at 1,580 meters near the head of Río Limón on Cerro Pirre. On Cerro Tacarcuna, C. O. Handley, Jr., collected male and female caught February 20 and 28, 1964, in mist nets at 1,250 and 1,340 meters. These agree in length of bill with birds from western Ecuador, but have the wing slightly shorter.

Specimens of this race from western Colombia and western Ecuador have the following measurements: Males (9 from Cauca and the western slope of Pichincha) wing 61.0-64.5 (62.3), tail 31.5-34.7 (32.9), culmen from base 35.2-38.3 (36.5) mm.

Females (4 from western Colombia and western Ecuador), wing 60.1-62.6 (61.6), tail 31.0-32.8 (32.1), culmen from base 35.2-37.5 (36.3) mm.

The race *rectirostris*, which ranges through the western Andes of Colombia to western Ecuador, is similar in color to *D. l. ludoviciae*

of eastern Colombia and western Venezuela, differing only in longer bill. The birds from the mountains of Darién agree in bill length with *rectirostris*, but, as stated, have slightly shorter wings.

PHAEOCHROA CUVIERII (De Lattre and Bourcier): Cuvier's
Hummingbird, Colibrí de Cuvier

Large; with foreneck and upper breast dull green, lower breast and abdomen washed lightly with pale cinnamon-buff.

Description.—Length 120-130 mm. Shaft of outer primary thickened toward the base in adult males. Adult (sexes alike), above dark green to metallic bronze-green, crown usually darker than the back; side of head obscurely dusky, with a small brownish white spot on the posterior border of the eye; wings dusky black, with a faint purplish gloss; central tail feathers metallic green to bluish green; three outer pairs with more or less of a blackish bar at end and white tip; foreneck, upper breast, and sides dull green to dull bronze-green, the feathers edged lightly with grayish buff; center of lower breast and most of abdomen pale brownish buff; tufts on each side of rump and on femoral area pure white; under tail coverts dull bronze-green, edged with white.

These hummingbirds range in more open lands, sometimes in the borders of gallery forest, at the inland border of mangroves, or about lines of trees along the fence rows in pastures. With their dull colors often they are inconspicuous, especially as they seem quieter than many of the family. In the main they feed at flowers, the large blooms of the emajagua (*Hibiscus tiliaceus*), common back of beaches and on the shores of larger rivers. Other flowering trees in the swamps are visited regularly. At these they may range in the tops of smaller trees, though it is common to find them near the ground. The feet are large, and the legs are strongly muscular. They sometimes perch to probe large flowers.

In the race *P. c. maculicauda* Griscom of Costa Rica, closely allied to the forms found in Panamá, Skutch (Condor, 1964, pp. 186-198) records that nesting comes during the rainy season. He has found 3 or 4 males resting on open perches at elevations 6 to 12 meters, spaced 30 to 35 meters apart. Here they sing a chirping, trilling song of a variable number of syllables. Nests, built by the females, are substantial rounded cups, made of soft materials mixed with fine fibers, decorated externally with mosses, lichens, and liverworts, supported by twigs on an inclined branch, or placed on a larger one that is horizontal. The complete set is of 2 white eggs.

Three of the four races now recognized are found in Panamá.

PHAEOCHROA CUVIERII CUVIERII (De Lattre and Bourcier)

Trochilus Cuvierii De Lattre and Bourcier, Rev. Zool., vol. 9, September (November) 1846, p. 310. ("isthme de Panama et Teleman, Amér. centr.," restricted to east central Panamá.)

Characters.—Foreneck, upper breast, and sides lighter green; lower breast and abdomen paler.

Measurements.—Males (13 from Canal Zone, eastern Province of Panamá, and San Blas), wing 67.1-71.6 (68.5), tail 39.6-42.7 (40.6), culmen from base 22.0-25.5 (23.5) mm.

Females (6 from Canal Zone and eastern Province of Panamá), wing 66.1-72.6 (67.6), tail 40.8-43.8 (42.5), culmen from base 23.8-25.8 (24.7) mm.

Weight, 8 males, 9.30 ± 0.24 grams; 4 females, 7.0, 7.5, 8.28, 9.0 grams (Hartman, Auk, 1954, p. 468. Though listed only as *P. cuvierii* all are of the typical subspecies).

Resident. Locally fairly common in the Canal Zone (Juan Mina, Gatun), eastern Province of Panamá (Pacora, La Jagua, Chepo, Chimán), and San Blas (Mandinga, Permé).

An adult male at Mandinga, shot from a high dead branch, January 22, 1957, may have been on a singing perch as described above by Skutch in observations of this species in Costa Rica. According to the original description *cuvierii* was described from a specimen taken by A. De Lattre. The inclusion of Teleman, which is in eastern Guatemala, in the localities cited obviously is in error as the hummingbird of this general form in that area is *Phaeochroa roberti*, marked by its wholly dark bill, which is considered to be a separate species though some have treated it as a race. Available information indicates that De Lattre made collections in Nicaragua, Panamá, and Perú. Under the travel routes of the period of his travels he would have reached Panamá either at Portobelo, Nombre de Dios, or Panamá City, so that it is appropriate to select east-central Panamá as a restricted type locality.

PHAEOCHROA CUVIERII FURVESCENS Wetmore

Phaeochroa cuvierii furvescens Wetmore, Proc. Biol. Soc. Washington, vol. 80, December 1, 1967, p. 230. (Zapotillo, 30 kilometers west of Soná, Veraguas, Panamá.)

Characters.—Foreneck, breast, and sides darker green than in the nominate race *cuvierii*, but not as dark as in *saturation* of Isla Coiba; larger than *cuvierii*.

A female, taken near Puerto Armuelles, Chiriquí, January 29, 1966,

had the iris dark brown; maxilla and tip of mandible black; base of mandible and bare skin between rami dull pink; tongue dull flesh color.

Measurements.—Males (14 from Chiriquí, Veraguas, and Los Santos), wing 70.1-75.8 (72.4), tail 41.0-45.6 (43.2, average of 13), culmen from base 22.7-26.6 (24.0) mm.

Females (10 from Chiriquí, Veraguas, and Los Santos), wing 68.4-72.4 (70.0), tail 42.0-45.8 (43.7), culmen from base 23.8-26.7 (25.5 average of 9) mm.

Resident. Fairly common locally in Chiriquí (Bugaba, El Banco, San Félix), Veraguas (Puerto Vidal, Zapotillo, Soná, Paracoté) and Los Santos (Guánico Arriba, Tonosí, Ensenada Venado, Pedasí). There are no records for the species between eastern Veraguas and the Canal Zone, so that this population appears to be isolated by the broad expanse of the savanna grasslands.

I recorded them feeding at flowers of the guayabo, in flowering trees in the mangroves. Others gleaned the bark of shrubs and trees.

Griscom, dependent on Hartert's brief description of *saturation* from Isla Coiba, placed these darker birds of the western mainland with the Coiba race, but in this was in error. The race *P. c. maculicauda* Griscom of Costa Rica resembles *P. c. cuvierii* in paler color, but is less brassy green on the foreneck, breast, and sides, and usually has the white tip on the outer rectrices less in extent. Also it is larger (in this agreeing with *furvescens*) as shown in the following tabulation:

Males (8 from Costa Rica), wing 70.3-74.4 (72.4), tail 41.3-44.6 (43.2), culmen from base 22.2-25.1 (23.8) mm.

Females (10 from Costa Rica), wing 68.0-71.7 (69.5), tail 41.8-44.4 (42.9), culmen from base 23.0-26.8 (25.1) mm.

PHAECHROA CUVIERII SATURATION (Hartert)

Aphantachroa cuvieri saturation Hartert, Bull. Brit. Orn. Club, vol. 12, December 30, 1901, p. 33. (Isla Coiba, Panamá.)

Characters.—Largest and darkest of the races; averaging darker green above, and on the breast and foreneck; decidedly darker on the lower breast and abdomen.

Measurements.—Males (2 from Isla Coiba), wing 75.8, 78.7, tail 45.0, 45.5, culmen from base 24.7, 25.6 mm.

Females (2 from Isla Coiba), wing 70.2, 74.1, tail 45.2, 46.7, culmen from base 24.7, 25.9 mm.

The type, in the American Museum of Natural History, taken by J. H. Batty, with the wing 70.2 mm., while marked male, probably is a female, from its small size, as is another Batty specimen with the wing 73.4 mm., also marked male.

The two pairs whose complete dimensions are given above are birds that I collected personally.

Resident. Found locally on Isla Coiba.

I found this attractive bird only in the white mangroves (*Laguncularia racemosa*) in the swamps where the Río San Juan and the Río Catival enter Bahía Damas. They moved quietly among the other hummingbirds that fed at the flowers in the tops of these trees, so that only when they were seen clearly were they identified by their larger size. They were not common.

CAMPYLOPTERUS HEMILEUCURUS MELLITUS Bangs: Violet
Saberwing, Ala de Sable Violáceo

Campylopterus hemileucurus mellitus Bangs, Proc. New England Zoöl. Club, January 30, 1902, p. 28. (Boquete, Chiriquí, Panamá.)

Large; bill curved, tail broadly white-tipped; male, breast violet, female gray, with blue spot on throat.

Description.—Length 145-150 mm. Adult male with shaft of three outer primaries curved and much thickened. Male, crown dusky glossed with bluish green; occiput to back, and under surface metallic bluish violet; scapulars, wing coverts, lower rump (in some), and upper tail coverts metallic green; tail with central feathers bluish green to bluish black; lateral pairs blacker, tipped broadly with white; wing dusky with a violet gloss; thickened primary shafts black; under wing coverts bluish green.

Adult female and immature, crown dusky; rest of upper surface, including wing coverts metallic green to bronze-green, changing on lower rump and central rectrices to more bluish green; lateral tail feathers as in male; under surface gray, whiter on abdomen, spotted on sides with metallic green; throat with a patch of violet-blue; under wing coverts and under tail coverts metallic green.

Measurements.—Males (16 from Chiriquí and Veraguas), wing 77.7-81.8 (79.4), tail 55.0-59.6 (56.6), culmen from base 29.8-33.7 (31.9) mm.

Females (7 from Chiriquí and Veraguas), wing 73.3-76.0 (74.3), tail 51.2-54.0 (52.4), culmen from base 33.2-35.6 (34.5) mm.

Weight, 3 males, 11.2, 11.25, 13.30 grams (Hartman, Auk, 1954, p. 468).

Resident. Fairly common through the Subtropical Zone, more rarely in the upper Tropical Zone, in the mountains of Chiriquí and Veraguas. Recorded also in the Azuero Peninsula on Cerro Viejo.

These large hummingbirds live in forest, though they may range out in more open areas as well as in the denser stands. In the usual encounter, I have found them feeding at flowers in undergrowth where they move quietly. While they are capable of rapid flight, ordinarily they seem less active than the smaller species of the family. They are more common above 1,200 meters elevation, though they may range lower as I have found them near 1,000 meters on the Quebrada Santa Clara in western Chiriquí, and there is a specimen in the California Academy of Sciences taken by Mrs. M. E. Davidson at 450 meters near Concepción, Chiriquí, on December 10, 1929. In the rainy season Worth (Auk, 1942, p. 364) found the males singing steadily a series of rather varied notes that through constant repetition became tiresome.

They are known in Panamá mainly from specimens taken in the mountains around Boquete, and from the western slope of the Volcano at Cerro Punta. From Cerro Pando they range across to the Costa Rican boundary. To the east, Mrs. Davidson secured a male on Cerro Flores above the upper Río San Félix on January 7, 1932 (specimen in the California Academy of Sciences). In Veraguas, Arcé collected specimens on the Cordillera del Chucú, at Calovévora, and near Chitra (Salvin and Godman, Biol. Centr.-Amer., Aves, vol. 2, July, 1892, p. 324). Aldrich (Scient. Publ. Cleveland Mus. Nat. Hist., vol. 7, 1937, pp. 70-71) on March 13, 1932, collected a male at Cavulla (900 meters elevation) on the watershed divide between Veraguas and Los Santos, a mile southeast of the peak of Cerro Viejo in the Azuero Peninsula. No others were found. The bird appears to be rare on this mountain area, as C. O. Handley, Jr., informs me that he did not see it during extended field work in 1962 on Cerro Hoya, 25 kilometers to the south.

The considerable series of this species in our collection demonstrates conclusively that two populations are represented, as recognized by Peters. When viewed at the appropriate angle of light males of the southern group (*mellitus*) are definitely violaceous, and those from the north (typical *hemileucurus*) blue.

Alexander Skutch (Nuttall Orn. Club, Publ. no. 7, 1967, pp. 20-21) in the highlands of Costa Rica recorded males singing from rather low perches in shrubbery, sometimes alone, sometimes with several congregated in scattered company. "In a weak, unmelodious voice

these sabrewings sang interminably *tsee tsee, tuc see, tu wit see*" in slow tempo and squeaky voice. At intervals the tail was spread in a flash of white. The only nest seen, placed on a slender, horizontal branch over a ravine "was a deep open cup covered with green moss that draped gracefully all around it. It was so bulky that, until with a mirror I saw the two white, elongated eggs, I surmised that it was the nest of a small flycatcher."

Two eggs in the collection of the British Museum (Natural History) were collected by C. K. Underwood at Azahar de Cartago, Costa Rica, July 3, 1895. They are dull white without gloss, long elliptical in form, one being slightly more pointed at either end than the other. They measure 17.3×11.8 and 16.8×11.6 mm. (These measurements differ very slightly from those listed by Schönwetter, Handb. Ool., pt. 11, 1966, p. 668).

FLORISUGA MELLIVORA MELLIVORA (Linnaeus): White-necked Jacobin, Colibrí Nuquiblanco

FIGURE 42

Trochilus mellivorus Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 121. (Surinam.)

Medium size; male, head and neck blue, back and breastband green; tail, abdomen, and band across hindneck white.

Description.—Length 108-115 mm. Middle upper tail coverts broadened and elongated so that they resemble rectrices and hide the true middle pair. Adult male, head, neck, and chest deep blue; upper hindneck, back, wing coverts, and upper tail coverts metallic green; a broad white band across hindneck; wings dusky, with a violaceous sheen; sides metallic green, in some individuals uniting to form a band across the breast; under wing coverts duller green; rest of under surface and tail pure white, the latter tipped with dusky or black.

Adult female, above metallic bronze-green, duller on the head; tail more or less bluish green, black at the end, tipped with white; wings as in male; foreneck and upper breast feathers dusky centrally, glossed with green, edged broadly with white; lower breast and upper abdomen with more white; lower abdomen usually white; under tail coverts blackish, with bluish or greenish sheen, tipped with white.

Young male, in general like female, but changing rapidly to adult dress.

An adult male, taken near Puerto Armuelles, Chiriquí, February 18, 1966, had the iris deep reddish brown; the entire bill, and the inside

of the mouth black; distal half of tongue slate color, basal half dull pinkish white; tarsus and toes fuscous-brown; claws black.

Measurements.—Males (10 from Panamá), wing 66.7-69.2 (67.7), tail 33.6-40.2 (36.2), culmen from base 19.4-23.2 (21.2) mm.

Females (10 from Costa Rica, Panamá, and Colombia), wing 62.0-66.4 (64.8), tail 31.8-34.8 (33.2), culmen from base 21.0-23.7 (21.8) mm.

Weight, 2 females, 6.8, 7.12 grams (Hartman, Auk, 1954, p. 468).

Resident. Locally fairly common in the tropical lowlands wherever

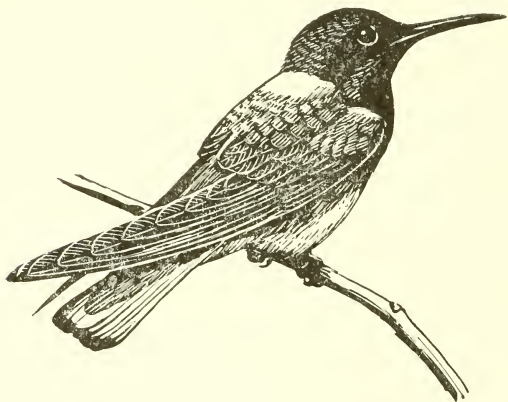


FIGURE 42.—White-necked jacobin, colibrí nuquiblanco, *Florisuga mellivora mellivora*.

there is moderate to abundant tree cover. Rarely to the lower Sub-tropical Zone, where recorded in Chiriquí to 1,500 meters at Quiel, above Boquete, and in Darién at 600 meters near Cana, on Cerro Pirre.

These hummingbirds, usually seen alone, are found regularly feeding at the flowers of the heliconias (the false banana) in undergrowth in the forest. In the shadows of early morning it is common also to find one or two flying above open channels along jungle rivers where groups of tiny diptera dance in the air. These the birds seize as they hover and circle about, often up to 50 meters above the water. If I have approached quietly, either in a piragua on the water, or afoot along the bank, they may continue their activities, but at any

sudden motion they disappear. When the rays of the rising sun fill the air the birds retreat to the shade of the forest. Here they may visit flowers, often high in the tree crown, or may glean over leaves and branches. The stomachs of two that I examined were crammed with small ants. Others have had the throat filled with bits of tiny diptera and small winged hymenoptera.

Females are retiring and are seldom identified, as their mixed pattern of markings shows little to distinguish them in the brief views that they offer.

Thomas Gilliard found a nest with 2 eggs on Barro Colorado Island on January 10, 1937. In February I saw full grown young around Bahía Almirante in Bocas del Toro.

The white-necked Jacobin has a broad range that extends from southern México through Central America to Bolivia and central Brazil, and east through Venezuela and the Guianas, including Trinidad. In this vast area the differences found are interpreted as individual. Those living on Tobago, which are larger in wing and tail, and slightly so in bill, are recognized as a subspecies *F. m. flabellifera* (Gould), confined to that island.

A. Ruschi (Bol. Mus. Biol. Prof. Mello-Leitão, Biol. no. 6, 1949, pp. 1-2) describes the nest as cup shaped, with eggs that measure 15×10 mm.

**COLIBRI DELPHINAE DELPHINAE (Lesson): Brown Violet-ear,
Colibrí Orejivioláceo Moreno**

Ornismya Delphinae Lesson, Rev. Zool., vol. 2, February 1839, p. 44. (Bogotá, Colombia.)

Brown, of medium size; with the violet ear patch that marks this genus.

Description.—Length 112-120 mm. Adult (sexes alike), above grayish brown to olive, with a slight gloss of bronze; upper tail coverts basally dull black; rump and upper tail coverts tipped with cinnamon-buff to dull white; tail greenish olive with a distal band of dull black and a cinnamon-buff tip, the whole with a sheen of bronze; wings dusky with a purple sheen; loreal and malar region cinnamon to dull white, the latter forming an indefinite stripe; a rather broad stripe of violet-blue on the cheeks; an irregular patch of metallic green, in some bluish on lower part, on the throat; under parts dull grayish brown, some with paler edgings that form indefinite streaks, others plain; under tail coverts cinnamon, with a central spot of grayish brown; hidden femoral tufts dull white to cinnamon.

Immature, upper surface, including wing coverts, with feathers tipped with cinnamon. Young stages are without the blue patch on the side of the head.

Measurements.—Males (9 from Costa Rica and Darién), wing 68.8-72.6 (70.6), tail 36.0-41.6 (38.9), culmen from base 17.6-20.2 (18.7) mm.

Females (5 from Costa Rica, Veraguas, and Darién), wing 64.4-68.7 (66.8), tail 35.7-38.3 (36.8), culmen from base 16.8-19.8 (18.4) mm.

Resident. Rare, in the Subtropical Zone of the mountains in Chiriquí and Veraguas, and on Cerro Pirre, Darién.

This is a species of broad range that has been found in widely scattered areas in British Honduras, eastern Guatemala, Costa Rica, Panamá, Colombia, Venezuela, Trinidad, and British Guiana, and south through Ecuador and Perú. Mönniche collected 3 at Quil and Lérida above Boquete in Chiriquí, Arcé obtained it at Calovévora in Veraguas, and Goldman in March 1912 secured 4 near Cana on Cerro Pirre in Darién. Two males were taken by Benson in the Cana area in 1928.

The only account of the manner of life in this species that I have seen is that of Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 148) who writes of it in Costa Rica that "it seeks flowering shrubs, shrubbery, hedgerows, new growth, and woodland borders, as in coffee plantations and gardens or at openings and roadsides. Several individuals may forage at a favorable site together with other species of hummingbirds. Though often seen at hedge and shrub height, it may rise 30 and 40 feet in trees. I have seen it fly-catch rapidly, that is, repeatedly making acrobatic flutters and returning to the same high perch."

Belcher and Smooker (Ibis, 1936, p. 32) describe 2 small nests, found on Trinidad, as built of plant down "saddled on a small twig of a low bush at about 4 feet from the ground under bamboos." Each held 2 eggs. "Two eggs from different nests measure 14.1×9.1 , and 13.7×9.2 mm."

The species was described by Lesson from 2 specimens, with no indication of locality, in the collection of Longuemare. Berlepsch and Hartert (Nov. Zool., vol. 9, April, 1902, p. 87) wrote "loc. ignot. We substitute Santa Fé de Bogotá, Colombia." Hellmayr (idem, vol. 13, February, 1906, p. 35) overlooked this as he said "loc. ignot.—We substitute Trinidad." As a further oversight, Brabourne and Chubb (Birds S. Amer. vol. 1, 1912, p. 123) list "Guiana" as the type locality without comment.

**COLIBRI THALASSINUS CABANIDIS (Heine) : Green Violet-ear,
Colibrí Orejivioláceo Verde**

Petasophora Cabanidis Heine, Journ. für Orn., vol. 11, pt. 3, May 1863, p. 182.
(Costa Rica.)

Green, of medium size, with a prominent violet patch on the side of the head.

Description.—Length 105-118 mm. Male, above metallic green to bronzy green, including wing coverts and central rectrices; outer rectrices greenish blue, all (including the middle pair) with a sub-terminal band of dull black; wings dusky with a sheen of purple, or dull brown with a faint coppery sheen; side of head banded prominently with violet-blue; foreneck bright metallic green, each feather with a bluish black central spot; rest of under surface, including under wing coverts, duller green, with the breast glossed with blue; femoral tufts white; under tail coverts bordered with dull buff to grayish buff.

Female and immature similar, but throat and breast duller.

A male, taken March 2, 1965, on the slopes of Volcán Barú, had the iris dark brown; bill black; tarsus and toes fuscous-black, claws black. In another male secured at the same point the following day it was noted that the tongue and inside of the mouth were deep black.

Measurements.—Males (15 from Costa Rica and Panamá), wing 63.4-68.8 (65.7), tail 38.1-43.1 (40.2), culmen from base 21.5-25.5 (23.6, average of 14) mm.

Females (8 from Costa Rica and Panamá) wing 58.2-63.5 (60.1), tail 35.5-38.3 (36.7), culmen from base 20.2-24.3 (22.6) mm.

Weight, 2 males 5.1, 5.47 grams; 1 female 4.8 grams. (Hartman, Auk, 1954, p. 468.)

Resident. Common in the mountains of Chiriquí and Veraguas, in the Subtropical Zone, from 1,350 to 2,100 meters, rarely to 2,650 meters on the west face of Volcán Barú.

Records are as follows: Chiriquí (Cerro Pando, west face of Volcán Barú, Cerro Punta, mountains above Boquete); Veraguas (Chitra, Calovévora).

This is a species of the open mountain slopes, found where shrub and tree growth is scattered or open. In such areas it feeds at flowers, or at times on gnats dancing in the air. I have found them especially common above the lava flow on the west base of Volcán Barú when the tall stalks of the yuccas had open flowers.

In adult males the lower feathers on the throat are slightly elongated and may be raised to form a ruff on the base of the neck,

an attractive ornament. Though usually they feed low down, often they rest on high perches in trees. Here the males call, a double, chipping note, that is repeated steadily for a considerable period.

Though the body is fairly heavy the leg muscles seem slight and weak.

When Heine named this bird in honor of his friend and professor Dr. Jean Cabanis, he was particular in using the form *cabanidis* with the following statement—"denn so, nicht *Cabanisi* muss der Genitiv dieses Namens nach der eigenen Ansicht seines Trägers gebildet werden."

Skutch (Nuttall Orn. Club, Publ. no. 7, 1967, pp. 22-39) gives a detailed life history of the species as a whole remarking (p. 32) "Over vast stretches of territory in the highlands of tropical America, from Mexico far South into the Andes, the squeaky song of the Violet-ear is one of the most prevalent of natural sounds through a large part of the year." Five geographic races of the species have been recognized in the area outlined. The one found in western Panamá, *cabanidis*, extends also into the highlands of Costa Rica. The major part of Dr. Skutch's observations relate to the nominate form of México and Guatemala. In Costa Rica he found that the subspecies *cabanidis* built a more bulky cup-shaped nest than the more northern bird, that differed also (p. 34) in being "attached to downward-drooping stems or dangling roots or vines, whereas . . . Guatemalan nests, made by the nominate subspecies, were on horizontal limbs of cypress saplings." The only eggs described by Skutch are those of the northern form. Three complete sets of 2 each measured as follows: 13.1-13.9×8.7-9.1 mm.

ANTHRACOTHORAX PREVOSTII VERAGUENSIS Reichenbach:
Prévost's Mango, Mango de Prévost

Anthracothorax veraguensis Reichenbach, Troch. Enum., July 18, 1855, p. 9, based on his plate "793" (error = 794), no. 4848. ("Veragua," type locality here designated as David, Chiriquí.)

Description.—Length 115-118 mm. Adult male, above metallic green to bronzy green, including wing coverts; upper tail coverts usually bluish green; central rectrices coppery green; other rectrices maroon, edged with bluish black; wings brownish slate, with narrow carpal edge dull white; chin and foreneck metallic emerald-green, the feathers black basally, occasionally with this showing as an indistinct spot; breast and central abdomen greenish blue; sides like back; under wing coverts duller green; under tail coverts dusky,

glossed more or less with greenish blue; femoral and lumbar tufts white.

Adult female, above, sides, and wings similar to male; lateral rectrices with a bluish black subterminal bar and white tip; underneath white from chin to lower abdomen, with a broad central stripe of greenish blue, this in some more or less black on foreneck; under tail coverts bluish green, tipped with white.

Immature, like female, but with the white central area on the lower surface bordered widely with rufous, and the under tail coverts with a narrow subterminal band of dull rufous at the end. In immature males the center line is blacker.

Measurements.—Males (10 from Veraguas, Herrera, and Coclé), wing 64.0-67.8 (66.0), tail 33.7-36.3 (34.5), culmen from base 25.2-28.3 (25.9) mm.

Females (4 from Veraguas and Herrera), wing 64.4-65.2 (64.8), tail 33.4-35.7 (34.8), culmen from base 27.0-30.0 (28.1) mm.

Resident. Found locally in small number in the Pacific lowlands from Chiriquí through southern Veraguas to Herrera and southern Coclé; 2 records for the Caribbean side of the Canal Zone (Gatun).

This is a species of the pasturelands and stream borders where brush and low trees offer some measure of cover, but where the terrain is open, not forested. The bird is rather uncommon in Herrera, where in 1948 I secured specimens near Santa María, Parita, París, El Rincón, and Pesé, and saw others in open pasturelands near Potuga. I found them among scattered low trees and bushes where they were feeding at flowers. To rest they chose perches where there was an open view, from near the ground to an elevation of 10 meters.

Nothing is known to me of its nesting.

The specific name of this little-known bird was included by Reichenbach in his *Trochilinarum Enumeratio* in 1855 based on manuscript notes of Gould, who did not publish his plate and description in his Monograph of the Trochilidae until May 1858. The name thus dates from the first reference in Reichenbach. Gould, on page 76 of his work, writes that he "received both drawings and specimens from M. Warszewicz, the celebrated South American traveller and botanist. The specimens referred to were collected near the volcano of Chiriquí in Veragua." P. L. Sclater (Proc. Zool. Soc. London, 1856, p. 138) wrote that this "well-known Polish collector was resident in David, Chiriquí sometime in 1849." This hummingbird was recorded by Sclater (*loc. cit.*, p. 140) as taken by Bridges "in the outskirts of

David," and later was included by Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 8, 1865, p. 177) in a list of birds collected near David by F. Hicks. It seems appropriate from this to designate David, Chiriquí, as the restricted type locality.

Enrique Arcé collected it on the Cordillera del Chucú and at Calobre in Veraguas (specimens in the British Museum with the locality Calobre). A male in the U. S. National Museum received in exchange from Graf von Berlepsch came from the taxidermist R. Herrera from Aguadulce, Coclé, about 1877. A female in the U. S. National Museum was taken March 16, 1931, at San Francisco, Veraguas, by R. R. Benson. It is of especial interest to record 2 males in immature dress from Gatun, Canal Zone, taken May 8, 1911 by E. A. Goldman since there are no other reports east of Coclé. It will be noted also that these are from the Caribbean slope, and that here, in the lower Chagres Valley, these birds are found with *Anthracothorax nigricollis*.

Resemblance of these hummingbirds to the widely distributed species *Anthracothorax prevostii*, with races in México and Central America south to Costa Rica, Isla Providencia and Isla San Andrés in the Caribbean, and the Guajira Peninsula, Colombia, and northern Venezuela in South America, is readily evident so that there has been suggestion that *veraguensis* of Panamá is also conspecific. My series from Herrera indicates clearly that this is so. *Anthracothorax prevostii*, in its currently accepted races, has the central area of the chin and throat black, while in typical *veraguensis* this area is wholly metallic green. In one adult male from Santa María, Herrera, the central area of the throat is deep black, shading off laterally to merge with the lateral green through edgings of that color, narrow at first but increasing in extent, until the black is concealed. Another has the hidden bases of the feathers on the upper throat black so that from an angle where the light is not reflected this area has a blackish cast. A third shows this same detail in lesser degree. The combination appears sufficient to justify listing the Panamanian population as a subspecies under the species name *prevostii*.

**ANTHRACOTHORAX NIGRICOLLIS (Vieillot): Black-throated
Mango, Mango Pechinegro**

Trochilus nigricollis Vieillot, Nouv. Dict. Hist. Nat., nouv. éd., vol. 7, March 1817, p. 349. (Brazil = Belém, Pará.)

Medium size; long, slightly curved bill; two white tufts on flanks;

male green, black on throat and breast; female, white underneath, with a black median line.

Description.—Length 115-120 mm. Adult male, bronze-green (in some coppery green) above, on sides, and on upper and under wing coverts; crown darker, often bluish green; foreneck, and center of breast and abdomen deep black, with a faint bluish sheen; rectal area, lower cheeks, and a broad band along the black throat and breast deep blue; femoral and lumbar tufts white; middle pair of rectrices dusky with a greenish gloss varying to greenish bronze; others deep maroon, edged with dark blue, in some dull brown at tips; wings brownish slate, with a faint purplish gloss; under tail coverts blackish, tipped irregularly with metallic green or metallic bluish green.

Adult female, above and on sides metallic green to coppery green, like male; below, a central stripe of black from chin to abdomen, broader on the throat, bordered broadly with white on either side; under tail coverts green, tipped with white or gray; tail with a broad blackish subterminal band, tipped narrowly with white; femoral and lumbar tufts as in male.

Juvenile, white underneath, with a faint black line on upper throat; crown dull cinnamon banded narrowly with black; lower back, rump, and secondaries tipped lightly with dull cinnamon-buff. In a succeeding stage the black median line from chin to abdomen is developed, when the young resemble the adult female except for the barring and tipping above.

An adult female taken at Pucro, Darién, February 10, 1964, had the iris brown; bill black; tarsus and toes fuscous; claws black.

Measurements.—Males (12 from Panamá), wing 65.0-68.2 (66.2), tail 32.7-37.7 (35.0), culmen from base 22.2-25.7 (24.1) mm.

Females (12 from Panamá), wing 62.0-66.7 (65.0), tail 31.8-36.8 (33.7), culmen from base 22.9-27.5 (25.2) mm.

Weight, 2 males 6.5, 7.22 grams; 2 females, 7.2, 7.47 grams. (Hartman, Auk, 1954, p. 468.)

Resident. Found locally in small numbers in the lowlands from southern Veraguas (Santiago), southern Coclé (Aguadulce), and the Canal Zone on both Pacific and Atlantic slopes to eastern Darién and eastern San Blas.

These birds live around thickets of false banana, and in clearings and open lands where there is ground cover of low bushes or small trees, less often in forest, where ordinarily they range near the borders. They feed at flowers and also are adept at taking small diptera from swarms dancing in the air. Some that I have handled

have had the throat filled with these insects. They also glean insects with the nectar that attracts them to flowers, as the stomach of one from Portobelo held bits of ants, a tiny bee, and small beetles. They rest regularly on open perches 10 to 20 meters from the ground.

On Barro Colorado Island breeding is recorded from December to March. Chapman (Tropical Air Castle, 1929, pp. 132-146) found them building their open, cup-shaped nests near the outer end of long limbs, on one occasion in an exposed situation not protected by leaves. The female, always alone, was aggressive to any other birds that came near, routing all intruders ranging from crow-size oropéndolas down to blue-gray tanagers. In one season a female, beginning in January, reared 2 young that finally left the nest toward the end of February. Sixteen days later the female occupied the same nest for a second brood.

Schönwetter (Handb. Ool., pt. 11, 1966, p. 669) gives measurements for 12 eggs as $14.3-15.9 \times 9.8-10.8$ mm.

This is another species of wide range in the tropical lowlands of South America from the north coast, including Trinidad and Tobago, south to Corrientes in northern Argentina, Paysandú in northern Uruguay, and southern Brazil. It reaches its northern limit in central Panamá. In spite of this extensive range no definite variations correlated with geographic area are evident. The main differences seen are in the shade of metallic green of the upper surface, which varies from a copper tone through bronze to deep green. A race *iridescens* that has been associated with *nigricollis* is placed by Zimmer (Amer. Mus. Nov., no. 1463, 1950, pp. 9-11) under the species *Anthraco-thorax prevostii*. Vieillot, in his original description, listed *nigricollis* as from Brazil. Zimmer (*loc. cit.*, p. 7) suggests Belém, Pará, as restricted type locality.

**KLAIS GUIMETI MERRITTII (Lawrence): Violet-crowned
Hummingbird, Colibrí Cabecivioláceo**

Mellisuga merrittii Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, April 1860, p. 110. (El Mineral, Veraguas, Panamá.)

Small; green above, small white spot behind the eye, crown blue; male with dark blue gorget.

Description.—Length 75-84 mm. Adult male, crown metallic violet-blue, changing to deep green on hindneck; back, wing coverts, and sides metallic green; upper tail coverts and tail bluish green, tipped lightly with white, the lateral pairs of rectrices with a broad subterminal band of dusky; wings dusky with a purplish sheen;

a small white spot immediately behind the eye; throat violet-blue (extending laterally to malar region); rest of under surface brownish gray, spotted and flecked on lower foreneck and breast with metallic green; under tail coverts tipped with white.

Adult female, above like male but with crown paler blue; under surface pale gray; lateral rectrices tipped broadly with grayish white.

Immature, like female, but with crown dull green to bluish green.

A female, taken at El Copé, Coclé, February 21, 1962, had the iris dark brown; maxilla and tip of mandible black; base of mandible fuscous-brown; toes mouse brown; claws black. (The tarsus is feathered.)

Measurements.—Males (10 from Costa Rica and Panamá), wing 47.7-51.9 (49.6), tail 26.1-29.9 (27.9), culmen from base 13.2-15.2 (14.0) mm.

Females (10 from Costa Rica and Panamá), wing 44.0-45.9 (44.9), tail 23.4-25.1 (24.3), culmen from base 13.2-15.1 (14.2) mm.

Resident. Uncommon; widely distributed in forests throughout the Republic from the lowlands to the Subtropical Zone.

Records, based on specimens, are as follows: Chiriquí (Bugaba, El Volcán, Boquete, Chame); Bocas del Toro (Almirante); Veraguas (Cerro Viejo, Castillo, Chitra, Calovévora, Santa Fé, Santiago, El Mineral); Coclé (Ventorillo, El Copé); western Province of Panamá (Cerro Campana); Canal Zone (Juan Mina); eastern Province of Panamá (Cerro Azul, Chepo, Cerro Chucantí); Darién (Cerro Sapo, Cana). The report by Aldrich (Scient. Publ. Cleveland Mus. Nat. Hist., vol. 7, 1937, p. 75) for Cerro Viejo, Veraguas, above Montijo Bay, is indication that the bird ranges along the forested spine of the Azuero Peninsula. It should be found also in the inland forests of San Blas.

While these birds have wide distribution I have seen them only casually as lone individuals feeding at flowers in forest. Rarely the angle of light on an adult male has brought out the brilliant blue of crown and throat. The more usual distinctive mark has been the small spot of white on the side of the head, immediately behind the eye.

Alexander Skutch (Wilson Bull., 1958, pp. 5-19) in Costa Rica has found them common, feeding at flowers, and nesting in the dry season. At this time males rest on open twigs well elevated, and sing steadily, a chipping song. Here also they come out into open areas, especially in feeding. He found females building their cuplike nests, of moss and cobweb, lined with plant down, attached to

pendant twigs or stems of vines, usually above running water. The 2 eggs usual among hummingbirds constituted the set.

Lawrence's name *merrittii* was based on an immature bird, apparently a male, forwarded by Dr. J. King Merritt from El Mineral, Veraguas. This district is located inland from the north coast at the foothills along the Río Santiago, a tributary of the Río Concepción, a short distance west of the present boundary with western Colón. The subspecies ranges locally from Nicaragua and Costa Rica through Panamá. Zimmer (Amer. Mus. Nov., no. 1463, 1950, p. 11) has noted that males from Central America have the crown cap distinctly blue, while in *Klais g. guimeti* and *K. g. pallidiventris* of northern South America this area is violet or purplish blue. In our series females from Panamá also have the crown bluer than those of the southern forms.

**LOPHORNIS DELATTRI LESSONI Simon: Rufous-crested
Coquette, Coqueta Corona Leonada**

FIGURE 43

Lophornis (Telamon) Lessoni Simon, Hist. Nat. Trochilidae, 1921, pp. 53, 285. (Bogotá, Colombia.)

Very small; male with long brown crest and shining green throat; female with forehead and upper throat brown.

Description.—Length 64-70 mm. Adult male, crown cinnamon-rufous, with a long crest of slender, pointed feathers; side of head, hindneck, back, and wing coverts metallic bronze-green; rump banded with white or cinnamon-buff; upper tail coverts purplish bronze; rectrices cinnamon-rufous, the central pair with a subterminal band and the others with a border of metallic bronze-green; wings dusky with a purplish sheen; lores, throat, and foreneck bright shining green, the feathers with cinnamon-buff bases; below this a few elongated white feathers also with cinnamon-buff bases; rest of under surface dark bronze-green, mixed slightly with cinnamon-buff; under tail coverts cinnamon-rufous.

Adult female, without crest; anterior area of crown cinnamon-rufous; a band of white to cinnamon-buff across rump; upper tail coverts and lower rump dull purplish bronze; rest of upper surface metallic bronze-green; central rectrices like back with a broad subterminal band of purplish black; others cinnamon-rufous, bordered and banded with black; upper throat and anterior face cinnamon-rufous, continuous with forecrown, the lower area spotted with bronzy black; lower foreneck and upper breast dull metallic bronze;

flanks and under tail coverts cinnamon-rufous; rest of under surface dull metallic bronze-green.

An immature bird in the Museum of Comparative Zoology, labeled as from "Isthmus of Panamá—Atlantic side," apparently a young male, without crest, has the throat dull neutral gray, flecked with whitish; forehead buff; tail, rump, and upper tail coverts as in adult.

An adult male from the Cerro Azul, January 31, 1961, had the iris dark brown; bill pale reddish brown (slightly browner than the crest), with the tip neutral gray; feet somewhat darker; claws black.



FIGURE 43.—Rufous-crested coquette, coqueta corona leonada, *Lophornis delattri lessoni*.

Measurements.—Males (12 from Veraguas, Bocas del Toro, Panamá, and Darién), wing 37.1-40.2 (38.1), tail 20.0-22.9 (21.6, average of 11), culmen from base 10.7-12.8 (11.4) mm.

Females (6 from Veraguas, Panamá, and Colombia), wing 35.8-37.9 (36.9), tail 18.0-20.2 (18.9), culmen from base 10.7-12.7 (11.8) mm.

Resident. Rare; on the Pacific slope known from Veraguas, eastern Province of Panamá, and Darién; on the Caribbean slope recorded from Cocoplum, Bocas del Toro, and in the Chagres drainage in the Canal Zone.

In Veraguas, Arcé collected this tiny bird at Castillo and Chitra. Benson secured 1 at Cocoplum, Bocas del Toro, October 26, 1927. In the eastern sector of the Province of Panamá Arcé secured 1 at Chepo, and I have 2—1 from Utivé at the southern base of the Cerro Azul, and 1 from Zumbador at 600 meters elevation in that range. Goldman secured 1 near Cana February 29, 1912, the only

record to date from Darién. This species crosses to the Caribbean side in the lower valley of the Río Chagres as McLennan secured it in his work along the line of the railroad, with some of his specimens marked Lion Hill. There are sight records for it on Barro Colorado Island.

Near Utivé, at the southern base of the Cerro Azul on March 17, 1949, I saw 2 in a small weed-grown field beside the Río Cabobré. They poised briefly motionless in the air, one half a meter above the other. Later I found another probing slowly in the corollas in a head of flowers, an individual that I secured. In 1961, Dr. A. G. Fairchild of the Gorgas Memorial Laboratory, gave me a male taken on January 31 at Zumbador in the Cerro Azul.

LOPHORNIS ADORABILIS Salvin: Adorable Coquette, Coqueta
Adorable

Lophornis adorabilis Salvin, Proc. Zool. Soc. London, November 1870, p. 207.
(Volcán de Chiriquí, Panamá.)

Very small; upper breast white, elsewhere rufous on under surface and tail; male, throat brilliant green, with elongated crest feathers; female without crest, throat white.

Description.—Length 70-78 mm. Adult male, forehead, lores, and space around eye metallic copper-bronze, with the concealed bases of the feathers white; center of crown, and a short crest of narrow, filamentous feathers, pure white; rest of crown and upper surface to the middle of the back, with the lesser wing coverts, dark bronze-green; rump cinnamon, broadly banded with white to buffy white, upper tail coverts dark coppery purple, with the longer feathers dull grayish brown; tail rufous, more or less edged with dull bronze-green; wings, including the primary wing coverts, dull black, glossed with purple; foreneck to chin and auricular region bright emerald-green, with a narrow, finely pointed plume of the same color that extends from the latter area to the center of the back; lower foreneck white; sides metallic bronze-green; rest of lower surface cinnamon-rufous.

Adult female, without decorative head plumes; forecrown sooty with a sheen of bronze; rest of upper surface to tail like male, except that the rump band usually is brighter buff; rectrices centrally bronze-green, with a black subterminal band, and base and tips rufous; foreneck white, speckled with light bronze-green; elsewhere as in male.

Immature male, like female, but lower foreneck more heavily spotted with green.

A female that I collected near Puerto Armuelles, Chiriquí, March 4, 1966, had the iris dark brown; base of mandibular rami and bare skin between the two dull reddish brown; rest of bill black; end of tarsus, toes, and claws black.

Measurements.—Males (13 from Costa Rica and Chiriquí), wing 38.3-41.0 (39.8), tail 24.7-29.9 (26.9), culmen from base 11.1-12.8 (11.9, average of 12) mm.

Females (10 from Costa Rica and Chiriquí), wing 36.7-39.7 (37.9), tail 19.9-20.6 (20.3, average of 9), culmen from base 11.7-12.9 (12.4) mm.

Resident. Rare; recorded in Chiriquí from the slopes of the volcano, and the lowlands near Bugaba, Bibalaz, and Puerto Armuelles.

This handsome species is known in Panamá to date mainly from the collections made by Enrique Arcé. Salvin, in the original description, writes that "the first specimen obtained by Arcé was a female, which though evidently belonging to a distinct species I hesitated to describe. This specimen was shot at Bugaba. The last collection includes a male, which Arcé tells me his brother David obtained high up on the southern slope of the volcano of Chiriquí." It is evidently this male that is to be regarded as the type. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1892, p. 365) in addition to these 2 list 1 from Bibalaz. This latter specimen, a male from the Gould collection, is in the British Museum. When I examined it in 1964 it had no catalog number. Another report of the species in Panamá is by Salvadori and Festa (Bol. Mus. Zool. Anat. Comp. R. Univ. Torino, vol. 14, no. 339, 1899, p. 7) who list a skin from Chiriquí, obtained from Arcé.

The main range of this beautiful little bird is to the north in central and southwestern Costa Rica, where locally it may be common, mainly on the Pacific slope. Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, pp. 150-151) says that it ranges in "scrubby woodland, in shrubby openings with scattered trees, and at partially cut-over borders mixed with second growth." Skutch (Wilson Bull., 1961, pp. 5-10) gives an interesting account of its life history, illustrated by a plate in color by Don Eckelberry. The birds feed at flowers, often those of the trees that shade coffee plantations. Nests, built in the early part of the dry season, were tiny cups of plant down and cobweb, covered externally with lichens. They were placed from 5 to nearly 20 meters from the ground on "slender twigs

far out from the trunk, where they were only slightly shaded and screened by the terminal foliage."

At the water supply dam for Puerto Armuelles, as I worked through a thicket near the stream, I came to feed at flowers in the higher branches above me. This has been my only view of the species in life, and apparently the only record for Panamá since the days of Arcé.

Generic allocation among this group of hummingbirds at present is not wholly certain. While the present species is placed here in the broad category of *Lophornis*, it should be noted that Simon (Hist. Nat. Trochilidae, 1921, p. 285) recognized *Dialia* Mulsant as a monotypic genus for it. Peters (Check-list Birds World, vol. 5, 1945, p. 34) unites it with *Lophornis helenae* in the genus *Paphosia* of Mulsant, Verreaux and Verreaux.

**POPELAIRIA CONVERSII (Bourcier and Mulsant): Green
Thorntail, Coli-espinoso Verde**

Trochilus Conversii Bourcier and Mulsant, Ann. Sci. Phys. Nat. Agric. Ind., Soc. Roy. Lyon, vol. 9, 1846, p. 313, pl. 9. (Bogotá, Colombia.)

Small; male with tail as long or longer than the body, with the outer feathers attenuated distally in threadlike tips; female dark with white spots below eye, on sides, across rump, and scattered over breast.

Description.—Length, male 104-110 mm., female 73-78 mm. Adult male, crown dark green with the feathers tipped narrowly with dusky; back and wing coverts lighter, more metallic green; rump and upper tail coverts coppery bronze, mixed more or less with bluish black; a white band across the rump; tail bluish black, with white shafts, changing to brownish gray distally, with tips of the elongated feathers much narrowed; wings and primary coverts dusky, glossed with purple; throat and foreneck bright metallic green; breast, abdomen, and under tail coverts darker; an indefinite patch of metallic greenish blue in the center of the breast, with the feather bases black; femoral and tibial tufts white.

Adult female, tail without elongated lateral plumes; above like male, but rump darker; four central rectrices bluish black, with bases dark green; outermost tail feather white at base, with a blue-black subterminal band and white tip; chin and foreneck dull black, more or less spotted with white; a broad white band down malar area; breast and abdomen dull black, with a broad white spot on the sides; sides elsewhere dull green.

Juvenile, with chin and upper throat grayish white.

Measurements.—Males (10 from Costa Rica and Panamá), wing 40.6-42.6 (41.6), tail 53.9-61.4 (56.7), culmen from base 13.2-14.3 (13.8) mm.

Females (9 from Costa Rica, Panamá, and Ecuador), wing 37.5-40.4 (39.4), tail 19.5-24.0 (22.0), culmen from base 13.1-15.6 (14.1) mm.

Resident. Found locally in the mountains of Veraguas and Darién. One report for the Atlantic slope in the Canal Zone, and 1 record in eastern Chiriquí.

The most western record is of a female taken by Mrs. M. E. Davidson, January 3, 1932, at about 975 meters on Cerro Chame, a ridge to the south of Cerro Flores in eastern Chiriquí. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1892, p. 366) record specimens taken by Arcé at Calovévora, Santa Fé, and the Cordillera del Chucú in Veraguas. Between March 9 and 20, 1912, E. A. Goldman collected a small series at 600 meters elevation on Cerro Pirre, near Cana. The only other record is of a young male taken by Galbraith and McLeannan on the Atlantic slope near the Panama Railroad and sent to Lawrence. Galbraith noted "but one seen, which was found in a dense forest." (Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1861, p. 319).

At Cana, Goldman found them feeding at high flowers of *Erythrina* in a tall tree, where often he was able to recognize the males by the long tail coupled with their small size. I noted 9 small spiders in the stomach (preserved in formalin) of one of the females that he collected.

The species was named for M. Convers, a French naturalist resident in Bogotá, Colombia.

CHLOROSTILBON ASSIMILIS Lawrence: Allied Emerald,
Colibrí Esmeraldino

Chlorostilbon assimilis Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, January 1861, p. 292. (Atlantic side of the Isthmus of Panamá, along the line of the Panama Railroad.)

Chlorostilbon panamensis Boucard, Gen. Humming Birds, March, 1894, p. 124. (Panamá.)

Size small; male wholly shining dark green, with white femoral tufts; female pale gray below, with a black band across ear coverts, a white spot behind eye, and tail tipped narrowly with pale gray.

Description.—Length 78-85 mm. Adult male, above dark metallic

green, occasionally with a very narrow line of lighter glistening feathers on the lores and adjacent to the base of the bill; tail coverts varying sometimes to bluish green; tail blue-black, the central pair of feathers glossed lightly with bluish green; wings dusky faintly glossed with purple; under surface brighter metallic green than the back, occasionally with a slight sheen of blue; femoral tufts white.

Female, above bright metallic green to bronze-green; with the upper tail coverts often bluish green; tail blue-black with the central rectrices often dull metallic green; two or three outer feathers tipped with pale grey; wings as in male; line from lores back across auricular region dusky; a post-ocular spot white or grayish white; under surface pale gray; lumbar tufts white.

Immature male, like female but darker gray below, changing quickly to the green adult dress.

Male, iris dark brown; bill black; tarsus fuscous-black; toes and claws black. Female similar, but tarsus often black.

Measurements.—Males (21 specimens), wing 43.5-48.3 (46.0), tail 26.4-29.1 (27.5), culmen from base 14.1-16.9 (15.6) mm.

Females (15 specimens), wing 42.6-46.8 (44.2), tail 23.9-26.3 (25.4), culmen from base 15.5-18.4 (16.9) mm.

Weight, 1 male 3.03 grams; 7 females 3.13 ± 0.06 grams (Hartman, Auk, 1954, p. 468.)

Resident. Fairly common in the tropical lowlands of the Pacific slope from the Costa Rican boundary to Chepo and La Jagua, more rarely to the Río Majé (Charco del Toro) and Garachiné. On the Atlantic slope recorded rarely in the lowlands of Bocas del Toro (Almirante, Cricamola); fairly common in the lower Chagres Valley from the Canal Zone (Barro Colorado Island, Colón, Juan Mina) east inland to the lower Río Boquerón (Peluca Hydrographic Station). Isla Coiba; Isla Parida, Isla Bolaños; Isla Gobernadora, Isla Cébaco; Isla Iguana; Isla Taboga, Isla Taboguilla, Isla Uravá; Archipiélago de las Perlas (islas Pacheca, Saboga, Contadora, Chaperá, Bayoneta, Málaga, Del Rey, Cañas, Santelmo, Pedro González, and San José).

This hummingbird, found in open lands, undoubtedly has extended its range as the forests have been cleared. It is a venturesome bird, as Bangs (Auk, 1901, p. 25) recorded observations by W. W. Brown, Jr., who, in travel by schooner, saw allied hummers crossing from the mainland to the distant Pearl Islands.

This species frequents the borders of woodland, hedge rows through the open fields, and thickets along stream beds, wherever

there are flowers. Mainly they are flower feeders, found with other species of the family at shrubs and trees like the guayabo, but also searching out smaller blossoms, often near the ground. They also glean branches and tree trunks. It is not uncommon to find them in the more open areas in gallery forest, and in coffee when in bloom. They come regularly into towns, where flowers attract them to ornamental hedges and open patios.

Little is recorded of their breeding. A female taken on Isla Coiba on January 16, 1956, was laying. On March 13, 1948, at La Cabuya, Herrera, I secured birds with enlarged gonads. Mrs. Sturgis (Field Book Birds Panama Canal Zone, 1928, p. 192) recorded nests at Quarry Heights, Canal Zone, in November 1924, and January 1923.

The female and the immature male of this species in life may be confused with those of *Lepidopyga coeruleogularis*, or of the smaller *Damophila julie*, but are identified by the whitish spot back of the eye, a mark that is not present in the other species mentioned.

On Isla San José on an early morning in late February when the thermometer fell to 69.5° Fahrenheit, in the strong breeze the air was cold. Soon after sunrise I found a male hummingbird of this species fluttering on the ground chilled and unable to fly so that I caught it in my hand.

Zimmer (Amer. Mus. Nov., no. 1474, November 10, 1950, pp. 6-12) has united the numerous mainland forms of emerald hummingbirds that as a group range from southern México to northern Brazil, under a single specific name, *Chlorostilbon mellisugus* (Linnaeus). This is a simplified procedure of a complex problem of relationships but one that, after considerable study based on extensive series of specimens, does not impress me as logical. As a general statement it would seem that division into a number of species, as proposed by Simon (Hist. Nat. Trochilidae, 1921, pp. 57-68) in major part may be more reasonable.

Viewed as a whole, the numerous populations may be separated into two groups on bill color, one in which the bill is wholly black, and one in which the basal part of the mandible in life is orange or orange-red (fading to a paler tint in museum skins, but always evident). This clearcut difference is found in both sexes, and does not vary within the separate populations. The distinction would seem to present a major character for group recognition between individuals. In Central America from México through most of Costa Rica the five populations now recognized as allied subspecies have the bill base light. In southwestern Costa Rica and most of

Panamá the bill is black, a character that continues in the birds of western Colombia and much of Ecuador and Perú. Males of the different groups, with one exception, have an ornamental crown cap that differs in brighter glittering color from the metallic iridescence of the rest of the upper surface. The exception is the bird of Panamá, named *assimilis* by Lawrence. In this, crown and upper surface are metallic green, except that in a few some of the tiny feathers of lores and anterior forehead glow. The difference is so definite that it seems reasonable to list *assimilis* as a separate species that, in addition, is marked by upper tail coverts which are shorter in relation to the length of the tail. The several other black-billed groups found across northern South America all have the distinct crown cap and relatively longer upper tail coverts. In Costa Rica *Chlorostilbon assimilis* ranges in the lowlands of the southwest, where it has been collected at Boruca and Buenos Aires, with 1 record, based on a specimen from Underwood, from the Dota region.

Simon (*loc. cit.*, p. 290) includes "Rep. de Panama" in the range of his subspecies "pumila (Gould)" in error, as that form is not found in the Republic.

**THALURANIA FURCATA (Gmelin): Fork-tailed Woodnymph,
Colibrí de Coronilla**

Trochilus furcatus Gmelin, Syst. Nat., vol. 1, pt. 1, 1788, p. 486. (Cayenne.)

Medium in size; male with green throat, crown deep blue in western Panamá, or shining green in Darién; female gray underneath with blue, white-tipped tail, and black bill.

Description.—Length, male 112-115, female 90-92 mm. Adult male with fairly long, forked tail; forehead and front of crown brilliant violet-blue in birds from central and western Panamá, bright shining green in those of Darién; back of head, hindneck and upper back black, with a sheen of dull green; center of back, lesser and middle wing coverts deep violet-blue; lower back and rump dark bluish green, primary coverts and tail very dark blue; wings dusky with a violet sheen; foreneck and upper breast brilliant emerald-green; lower breast and abdomen dark violet-blue; femoral area white; under tail coverts steel-blue, mixed more or less with white.

Female, above metallic green; forecrown duller, with the feathers dull green tipped with bronze; wing coverts bluish green; middle pair of rectrices greenish blue at base, then dark blue, some becoming black at tip; the two outermost tail feathers tipped with white or grayish white; wings dusky; lower surface grayish white, with the sides

light metallic green, in some this extending across the breast almost to the median line.

Immature male, at first like the female, but with wing coverts more greenish blue; in a succeeding plumage like adult, but duller above, without the crown patch and with the breast and abdomen dusky gray spotted irregularly with dark blue, tipped lightly with metallic green.

These are forest birds that range regularly in open areas where they feed at flowers. Males in the two races found in the Republic are easily distinguished by the color of the crown, but females are closely similar. The latter sex resembles that of the sapphire-throated hummingbird but may be identified in life by the wholly black bill, and the grayish white lower surface. It should be noted, however, that immature individuals of the present species when first on the wing may have the base of the mandible light-colored, a tint that disappears with maturity.

This green-throated, bluish purple-breasted group of hummingbirds is widely spread from southern México through Central America and much of northern and central South America. Variation in markings is found mainly in the crown color in males. Those with this area deep blue or brilliant green range from southern Central America through most of Colombia west of the Amazonian lowlands, along the western boundary of Venezuela, and south through Ecuador. In most of the region from Venezuela south through Brazil males have the upper surface of the head dull without any striking crown patch of glittering color. Current treatment, following Peters' summary in 1945 (Check-list Birds World, vol. 5, pp. 45-48), unites all these groups as one species under the name *furcata*. While I have followed this terminology I am not certain that this is appropriate. Those in which the males have a glittering crown, the group *colombica*, while differing in the extremes of deep blue and shining green on the fore part of the pileum, appear connected. Most of the green-crowned group from Darién and the eastern San Blas through Colombia have one or two to several blue feathers along the posterior border of the glittering area, markings that are absent only in the far south in Ecuador. I am not aware of any similar marking to bridge the gap to those with plain crown, except that the plain green on the head is the usual pattern of the juvenile in the *colombica* group, as it is in many other unrelated hummingbirds. Because of this scatter it appears probable that a superspecies with two or more species rather than a single species may be more appropriate to represent the complex status of the group. Descriptions of the two forms found in Panamá follow.

THALURANIA FURCATA VENUSTA (Gould)

Trochilus (Thalurania) venusta Gould, Proc. Zool. Soc. London, pt. 18, 1850 (February 28, 1851), p. 163. (Volcán de Chiriquí, Chiriquí, Panamá.)

Characters.—Adult male, with the forecrown brilliant violet-blue; violet-blue area of back usually more extensive. Female, somewhat paler gray on lower surface.

An adult male, taken at the Candelaria Hydrographic Station, Panamá, March 11, 1961, had the iris wood brown; bill black; tarsus and toes fuscous; claws black.

Measurements.—Males (15 from western and central Panamá), wing 51.0-55.0 (53.1), tail 38.4-45.0 (41.2), culmen from base 19.1-24.2 (20.5) mm.

Females (10 from western and central Panamá), wing 48.0-49.7 (48.6), tail 27.4-30.2 (28.7), culmen from base 20.0-22.4 (21.0) mm.

Resident. Locally common in forested areas in the Tropical and lower Subtropical Zones. Recorded from Chiriquí, Veraguas, Panamá, Bocas del Toro, the Caribbean slope of Coclé, Colón, and the lower Chagres Valley in the Canal Zone and adjacent eastern Province of Panamá (Candelaria Hydrographic Station, Río Pequení).

This form was named from a specimen collected by Warszewicz on the Volcán de Chiriquí, probably in the area of the lower hills. I found it in small numbers at 1,200 to 1,300 meters on Cerro Pando, and at Santa Clara toward the Costa Rican boundary. Brown secured it at Divalá in the lowlands. In Veraguas, Arcé collected it at Santa Fé, Chitra, and Castillo, with records also for Santiago. It has not been reported as yet in the hills on the Pacific side of Coclé, but should be found there. It is common on Cerro Campana above 850 meters, and I collected it also in the Cerro Azul, and in the hills north of Chepo near the Río Mamóní. On the Caribbean side, a few have been found in the forests above Bahía Almirante, and others near Bocas del Toro. I secured them also along the Río Indio at Chilar in western Colón, and higher up near El Uracillo, where this stream comes out of the interior hills, in northern Coclé. In the lower Chagres Valley they are common on Barro Colorado Island. On March 3, 1961, I caught 1 in a mist net, and on March 6 shot another, a male, at the Candelaria Hydrographic Station on the lower Río Pequení. My most eastern records are near the Río Mamóní above Chepo.

On Barro Colorado Island they may appear about flowering shrubs in the clearing at the laboratory at dawn when the light is still so dim that it is barely possible to see them. In 1935 Skutch recorded nests

in the forest there on March 2 and 25. I have found them especially common in the forests on Cerro Campana.

Beyond western Panamá their range extends through Costa Rica into Nicaragua.

THALURANIA FURCATA FANNYI (De Lattre and Bourcier)

Trochilus Fannyi De Lattre and Bourcier, Rev. Zool., vol. 9, September (November) 1846, p. 310. (Río Dagua, near Buenaventura, Valle, Colombia.)

Characters.—Adult male, with the forecrown brilliant metallic emerald-green; violet-blue area of center of back usually less extensive.

Female, slightly duller gray on lower surface, especially on the lower breast and abdomen.

Measurements.—Males (14 from San Blas and Darién), wing 51.5-54.5 (53.2), tail 37.5-43.5 (39.8), culmen from base 20.5-23.0 (22.0) mm.

Females (11 from San Blas and Darién), wing 48.6-50.9 (49.6), tail 27.8-30.8 (29.1), culmen from base 20.5-23.6 (21.7) mm.

Resident. Locally common in forested areas in Darién and eastern San Blas; west possibly to eastern Colón (Portobelo, Cerro Bruja).

The first records for Panamá are of specimens taken by Goldman near 600 meters elevation on Cerro Pirre in March and May 1912. Benson secured others on this mountain in 1928, and I recorded them there in February 1961. Thomas Barbour and N. Brooks secured this race on Cerro Sapo and at Esnape, near Sábalo in the lower Sambú Valley in April 1922. Hasso von Wedel collected a long series in the eastern San Blas, beginning in 1929, at Permé, Ranchón, and Puerto Obaldía. Near Jaqué in 1946 I found them in tall, swampy forest where there was little undergrowth, and also along a small stream at the border of old fields. When I shot 1 from a high perch, as it fell 2 others that attacked it in the air drove the body so far to one side that we could not find it. The following season this was the most common hummingbird on the upper Río Jaqué. Here they fed at flowers of *Heliconia*, and were found especially around thickets of these plants. They ranged in open areas as well as in shaded woodland. Like most others they are pugnacious and decoyed constantly when we were calling birds. One under such excitement struck a long-tailed hermit so forcefully that both fell to the ground. They were common in the forest on the Quebrada Venado, back of Armila, San Blas, in February and early March 1963. I collected 1 male near Puerto Obaldía on March 16 in heavy shade beside a quebrada. The

following year I secured another on March 10, 1964, at 575 meters elevation on the Río Tacarcuna. A young male from Portobelo, and a female from Cerro Brujo, taken by Goldman show the darker under surface usual in this race. The identification needs confirmation from adult males.

The stomach of 1 taken by E. A. Goldman on Cerro Pirre was filled with bits of small diptera and fragments of 1 spider. Another held a fulgorid, 4 tiny wasps, and remains of other small hymenoptera.

Griscom in his description of *Thalurania f. subtropicalis* (Bull. Mus. Comp. Zool., vol. 72, 1932, p. 337), with the type locality above Cali, Valle, Colombia, included Cerro Pirre in the northern limit of the range, but in this was in error. This race in the adult male differs from *fannyi* mainly in more bronzy green on the posterior crown and hindneck, and in more restricted blue on the back. While adults are distinct, immature males of *fannyi* show similar markings, which must have led to the error. Actually the range of *fannyi* extends in Colombia into northern Chocó near the lower Atrato at Acandí and Unguía. On the Pacific slope it continues south to Nuquí, and inland to the slopes of the Serranía de Baudó.

Griscom also was in error in the same paper (*loc. cit.*, p. 335) in his description of *Thalurania colombica insulicola* when he cited his type, a male taken by W. W. Brown, Jr., February 28, 1899, as from "San Miguel, Pearl Islands, Bay of Panamá." The specimen was collected by Brown at San Miguel, but at another place of this name located on the northern slope of the eastern end of the Sierra Nevada de Santa Marta in Magdalena, Colombia. The name *insulicola*, therefore, is a synonym of *Thalurania furcata colombica* (Bourcier) of this region, and has no connection with Panamá.

PANTERPE INSIGNIS Cabanis and Heine: Fiery-throated
Hummingbird, Colibrí Garganta Roja

Panterpe insignis Cabanis and Heine, Mus. Hein., pt. 3, March 22, 1860, p. 43.
(Costa Rica.)

Large; highly iridescent green, with flame color on throat; crown and breast spot violet-blue.

Description.—Length 112-115 mm. Sexes alike, the plumage highly iridescent throughout; crown bright metallic blue; lores, supra-auricular area and nape black with a sheen of coppery bronze; back and wing coverts metallic green; upper tail coverts bluish green; tail blue-

black; wings dusky with a purple sheen; throat centrally brilliant orange-red, changing to bronze-green on the sides; a spot of violet on center of breast, changing laterally to deep blue; rest of under parts bluish green.

Immature, similar to adult but colors duller.

A male, taken on Volcán Barú, March 2, 1965, had the iris dark reddish brown; maxilla and tip of mandible black; base of mandible dull pinkish red; tarsus and toes fuscous-black, claws black.

Measurements.—Males (10 from Costa Rica and Chiriquí), wing 63.0-69.2 (67.0), tail 38.0-45.4 (42.5), culmen from base 21.8-23.8 (22.9, average of 9) mm.

Females (10 from Costa Rica and Chiriquí), wing 60.2-64.6 (62.4), tail 37.7-42.8 (39.9), culmen from base 20.2-23.2 (21.4) mm.

Resident. Found locally in the mountains between 1,800 and 3,000 meters in far western Panamá, mainly in Chiriquí, but also on the higher levels on the Caribbean slope in Bocas del Toro. Recorded on the summit of Cerro Picacho.

Little is known of this beautiful species in Panamá other than the specimens in museum cabinets. I saw it for the first time as I came out on the open, rocky ridge on the summit of Cerro Picacho, when excited, chattering calls and a loud humming of wings drew my eyes to one of these hummingbirds that was feeding around the open branches of a flowering shrub. In March 1965, on the western face of El Barú several were collected between 2,300 and 2,600 meters in the shrubbery scattered across the steep slopes.

The series taken by Mönniche above Boquete, as recorded by Blake (*Fieldiana: Zool.*, vol. 36, 1958, p. 517), includes male and female from the northern slope of the Cordillera near the Holcomb Trail in Bocas del Toro. Bangs (*Proc. New Engl. Zool. Club*, 1902, p. 29) recorded the species earlier from this slope from 1 taken by W. W. Brown, Jr. Slud (*Bull. Amer. Mus. Nat. Hist.*, vol. 128, 1964, p. 152) writes that in Costa Rica he had heard them utter "A rapid set of two or three snaps, not unlike those of a manakin" in addition to the usual twittering calls.

Published records from Veraguas are in error, taken from older specimens marked "Veragua" a term which in early days covered all of western Panamá. The bird is found in the Republic only in the higher mountains in the west.

The species is common on the volcanoes of Costa Rica, where it ranges in the shrubbery of the parklike areas of the higher slopes.

DAMOPHILA JULIE PANAMENSIS Berlepsch: Violet-breasted Hummingbird, Colibrí Pechivioláceo

Damophila panamensis Berlepsch, Journ. f. Orn., vol. 32, pts. 3-4, July-October 1884, p. 312. ("Panamá and Veragua," here restricted to the Atlantic slope along the Panama Railroad, Canal Zone, Panamá.)

Small; male, foreneck glittering green, rest of under surface blue. Female differs from that of *Lepidopyga c. coeruleogularis* in smaller size and blue central tail feathers.

Description.—Length, male 87-92 mm., female 80-84 mm. Male, upper surface metallic green, with the rump more or less bronze-green; tail blue-black; wings dusky with a purple sheen; foreneck and lower side of head brilliant metallic green, in some with a bluish cast; breast and sides metallic violet-blue; femoral tufts white; abdomen and under tail coverts dull black with a sheen of blue or dull green, with the sides of the abdomen adjacent to the femoral tufts partly white.

Female, metallic bronze-green above, more bronze on rump and upper tail coverts; tail blue-black to dull bluish green with two outer rectrices tipped with light gray; wings as in male; under surface pale gray, whiter on breast; in some the sides of the throat spotted with metallic green; under tail coverts dull brownish gray.

Immature male, at first like female, or with foreneck spotted with shining bluish green.

Maxilla and extreme tip of mandible black; rest of mandible orange-yellow (from Museum skins).

Measurements.—Males (10 from Coclé, Panamá, Canal Zone, and Darién), wing 42.8-45.0 (43.8), tail 28.6-31.4 (30.3), culmen from base 14.2-15.7 (15.0) mm.

Females (10 from Canal Zone, Panamá, and Darién), wing 41.2-43.8 (42.9), tail 25.2-27.5 (26.5), culmen from base 15.6-17.3 (16.5) mm.

Weight, 11 males, 3.35 ± 0.08 grams; 5 females, 3.03 ± 0.08 grams (Hartman, Auk, 1954, p. 468.)

Resident. Common in the lowlands from the western sector of the provinces of Panamá and of Colón east to the Colombian boundary in Darién and San Blas.

In the western area of the Province of Panamá I have collected this bird at the border of a mangrove swamp near Bejuco, and also on Cerro Campana, where I secured 1 in the lower edge of the forest at 850 meters. This is the highest elevation at which I have seen this species. On the Caribbean side in western Colón it is found along

the valley of the Río Indio from a short distance west of the village at the mouth (near Punta Pilón) inland to near El Uracillo within the northern edge of the Province of Coclé. These are the western limits as known at present on this slope. The record for Calovévora, on the Caribbean slope of Veraguas, by Salvin (Proc. Zool. Soc. London, 1870, p. 211) seems to be in error, as though Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1892, p. 209) also include this in their references they say that "all the specimens we have seen of this species are from the line of the Panama Railway or from Chepo on the Río Bayano." I found no specimen from Veraguas in the Salvin and Godman collection in the British Museum.

In view of the range now known for *panamensis*, records that include it as a bird of Costa Rica have no apparent validity. For an outline of these see Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 152). In brief review, Lawrence in his *Catalogue of the Birds found in Costa Rica* (Ann. Lyc. Nat. Hist. New York, vol. 9, 1868, p. 128), based on collections in the Smithsonian Institution, includes "365. *Juliomyia typica*, Bonap. Julian Carmiol," with no other comment. As I have not found a specimen or a catalog entry in our records to correspond with these data, it seems probable that the reference was to some other species wrongly identified. Frantzius (Journ. f. Orn., 1869, p. 317) who listed "365. *Juliomyia typica* Bonap.," also with no comment, merely copied the name from Lawrence. Zeledón (Cat. Aves Costa Rica, 1882, p. 21) evidently also used this same source as he included it in his list as number "458 *Juliomyia typica*, Bon." without other data. A specimen in the American Museum of Natural History (no. 60150) received from Captain Dow, and labeled "Costa Rica," is an adult male. I find from our records that Ridgway borrowed, measured, and listed this bird as "an adult male said to be from Costa Rica" (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 521). As he included "Costa Rica?" at the end of his outline of the range it is evident that he was uncertain as to validity of the data. This specimen is the only one ascribed to Costa Rica that has come to attention. J. M. Dow, steamer captain on the Pacific Coast for the Panama Railway Company, a Corresponding Member of the Zoological Society of London, had broad interests in natural history. Salvin (Proc. Zool. Soc. London, 1863, p. 168) relates that the type of the tanager *Tangara dowi* was given to him by Captain Dow who obtained it during a visit to San José, Costa Rica, but "was unable to inform me exactly whence it came." In another account Salvin (*loc. cit.*, 1864, p. 343) writes other details

of his association with Dow when he came to Panamá to visit McLeannan, Station Master at Lion Hill on the Panama Railroad. The specimen described above as presented by Dow labeled "Costa Rica" is identical in form and appearance with hummingbirds of this same kind collected and prepared by McLeannan. It seems possible that this may have been its source.

The bird is common in the Chagres Valley, and also wherever there is forest shelter for it eastward through Darién and the Comarca de San Blas. Beyond Panamá it continues into the lower Atrato Valley of Colombia in northern Chocó (Acandí, Unguía), and also on the eastern side of the Golfo de Darién in extreme northern Antioquia. Its eastern limit is in the lower valley of the Río Sinú, as in the lower Cauca-Magdalena drainage beyond it is replaced by nominate *Damophila julie julie*. The male of the latter bird has the anterior half of the pileum bright, glittering green, but otherwise is like *panamensis*. Ridgway (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 520) recorded *Damophila julie julie* from Bugaba, Chiriquí, but in this was misled by a specimen wrongly labeled. Griscom in his work on Panamá evidently did not examine this skin. This is apparent from Peters' statement in a footnote under *Damophila j. panamensis* (Check-list Birds World, vol. 5, 1945, p. 50) where he says "Griscom informs me that the specimen from Chiriquí, referred to *D. j. julie* by Ridgway, is an aberration of the present form." Ridgway's source was U. S. National Museum catalog no. 150788, purchased in a collection made by two missionaries, H. Th. Heyde and Ernesto Lux. The bird, an adult male, is labeled "Bugaba-Chiriquí," but is a well-marked example of *Damophila julie felicianae* (Lesson) of Ecuador. As the collection in which it was received in addition to specimens from Panamá included other hummingbirds from Ecuador the locality on the label of the individual under discussion certainly is erroneous.

In view of the range given for *D. j. panamensis* in Colombia, it is pertinent to remark that Ridgway's record of typical *julie* from Turbo in northern Chocó on the Gulf of Darién also is taken from a specimen with questionable data. This is U. S. National Museum number 17902, collected on the Michler Survey for a possible canal route through the lower Atrato. The bird is cataloged as part of the collection in question, but instead of the printed label of this expedition, has a small tag marked Smithsonian Institution, with the locality "Turbo. N. G. Schott" written by another hand. As the naturalists in the party secured other hummingbirds at Cartagena

it is probable that the bird, which is a specimen of *D. j. julie*, was taken there. We have modern specimens of *panamensis* collected by Carriker at Necoclí, near Turbo, on the eastern shore of the Gulf of Darién that establish this race as the form of that area. Typical *D. j. julie* does not range west of the lower Cauca Valley.

In the main the violet-breasted hummingbirds are forest inhabitants that rest on high or low perches indifferently. They range regularly in groves, and in savanna areas frequent the lines of trees that border water courses. It is one of the species that feeds constantly at flowers, and when the guayabos are in blossom comes out regularly in the open. As the males move about they hold the long tail tightly folded and narrowed. While they perch at times momentarily among the flowering branches at which they feed it is more usual to find them at rest in the open.

A nest found by Major General G. Ralph Meyer in the gardens at Summit, Canal Zone, January 19, 1941, was the usual little, open cup of plant downs, saddled on a small branch about a meter and a half above the ground. The 2 eggs weighed 8 and 9 grams respectively. Unfortunately, they were incubated and were broken in preparation so that they could not be preserved. Darlington (Bull. Mus. Comp. Zool., vol. 71, 1931, p. 395) gives the egg measurements for *Damophilula julie julie*, (a bird of closely similar size to *panamensis*), collected at Río Frío, Magdalena, as 13×8 mm.

This is one of the common species of its family within its range. It is seen regularly on Barro Colorado Island around the laboratory clearing when the shrubs that grow in the open are in bloom.

As the specimens available to Berlepsch when he named *panamensis* must have come in part from the vicinity of the railroad it seems appropriate to designate the Atlantic slope on the Panama Railroad as the type locality.

LEPIDOPYGA COERULEOGULARIS COERULEOGULARIS
(Gould): Sapphire-throated Hummingbird, Colibrí Zafirino

Trochilus coeruleogularis Gould, Proc. Zool. Soc. London, pt. 18, 1850 (February 28, 1851), p. 163. (David, Chiriquí, Panamá.)

Lepidopyga caeruleogularis confinis Griscom, Bull. Mus. Comp. Zool., vol. 72, January 1932, p. 333. (Permé, San Blas, Panamá.)

Small; base of mandible reddish to orange; male, foreneck and upper breast violet-blue, rest of under surface green. Female, under surface pure white, with sides spotted heavily with bluish green.

Description.—Length 85-95 mm. Tail forked, rather long. Male,

above metallic green; central rectrices bronze-green basally, blue-black at tip; others blue-black; wings dusky with a violaceous sheen; side of head, foreneck, and upper breast metallic violet-blue; lower breast, abdomen, and sides metallic green to bluish green; under tail coverts metallic green, edged with white.

Female, above metallic bronze-green; middle rectrices the same, but blackish at ends; others bluish black, tipped with grayish white; wings as in male; central under surface including under tail coverts, pure white; sides metallic green.

Juvenile, like female but feathers of upper surface edged narrowly with cinnamon-buff; under surface heavily spotted with metallic green.

An adult male collected at El Potrero, Coclé, March 6, 1962, had the iris dark brown; maxilla and tip of mandible black; base of mandible buffy brown; tarsus, toes, and claws black. Two males from Puerto Obaldía, San Blas, February 18, 1963, and Puerto Armuelles, Chiriquí, February 21, 1966, were similar, except that the base of the mandible in the first was dull reddish flesh color, and in the second pale pink.

Measurements.—Males (11 from Panamá), wing 48.3-50.8 (49.4), tail 30.1-33.8 (32.2), culmen from base 18.2-19.9 (19.1) mm.

Females (10 from Panamá), wing 46.3-49.9 (48.3), tail 27.0-30.1 (28.9), culmen from base 18.2-21.7 (19.7) mm.

Resident. Common in the lowlands on the Pacific slope from western Chiriquí to the coastal area of western Darién; on the Caribbean slope from the lower Chagres Valley to the Colombian border. Isla Coiba; Isla Cébaco.

The bird was described by Gould from David in Chiriquí. I have found it in this general region below Alanje, toward the sea, and at Olivo, in the Puerto Armuelles area; in late February I secured 2 in mangroves. In 1953 it was abundant near Soná in western Veraguas. There are early records by Arcé for Castillo and Calobre, but the report for Santa Fé (Salvin, Proc. Zool. Soc. London, 1867, p. 156) is doubtful, since it is the only record from the highlands, made at a time when Salvin's notations as to localities were sometimes uncertain. The species is common in the lowlands of the eastern side of the Azuero Peninsula to beyond Pedasí. In eastern Panamá I have found it east to the mouth of the Río Majé, and it occurs also in southwestern Darién around the shores of Golfo San Miguel (Punta Sabana, Garachiné, mouth of the Río Sambú). This is the known eastern boundary on the Pacific side as none have been found inland along the lower Río Tuira. The species crosses through the

lowlands of central Panamá to the Atlantic side through the lower Río Chagres (Barro Colorado Island, Gatun, Mount Hope, Colón) and then continues east through eastern Colón (Portobelo) and San Blas. I found it near Mandinga in 1957, and there are numerous records to the east at Permé and Puerto Obaldía. Griscom described a race *confinis* from this area, but with more material this is found not to be separable. In Colombia the typical form ranges to the lower Atrato Valley and the eastern shore of Golfo de Darién (Necoclí). It was interesting to find them fairly common in the lowlands of Isla Coiba and on Isla Cébaco, as they do not occur on Taboga or other island groups offshore.

These birds range around shrubbery and open groves, and in forested areas are found along the borders. While they may rest on shaded perches, they range into the sun in the open to feed at flowers. The forehead regularly carries pollen grains, occasionally in such an amount that the feathers appear yellow. They also glean insects from leaves and weed stems. At sunrise I have seen them bathing in dew accumulated on vegetation during the night, brushing back and forth over leaves until the breast was wet, and then perching to preen and arrange their plumage.

At Mandinga, San Blas, on January 23 and 25, 1957, I found 2 nests of this species, both placed in little forks in the tops of dry weeds a meter tall that projected above a stand of grass. This grew completely in the open in a broad clearing prepared for a fighter plane airstrip during World War II. The nests were the usual open cups, so placed that they were clearly visible at a distance of 75 meters. They were made of light-colored plant downs, deeply cupped, and were covered externally with bits of lichen and dead leaf. Each held 2 white eggs, obviously so far along in incubation that it was useless to collect them. At hatching the young had a line of cinnamon-colored down on either side of the back but otherwise were naked. The egg shells were not removed from the nest, but were so fragile that the weight of the young birds soon broke them into tiny fragments. Growth was amazingly rapid as within 3 days the first 2 nestlings were at least four times their bulk on hatching, with heads as large as the original eggs. On February 4 the first 2 were developing pin feathers, and on February 7 had the back covered with green feathers. On February 12 they filled the nest completely with bill and tail projecting. As I looked at them, suddenly both took wing, one to perch immediately on a grass stem 15 meters distant, while the other turned to hover in the wind for half a minute before it settled

on another swaying grass stem. The females gleaned the grass heads regularly in gathering food.

HYLOCHARIS ELICIAE EARINA Wetmore: Blue-throated Goldentail, Colibrí Cola de Oro

Hylocharis eliciae earina Wetmore, Proc. Biol. Soc. Washington, vol. 80, December 1, 1967, p. 233. (Quebrada Chucantí, 225 meters elevation, Cerro Chucantí, Serranía de Majé, eastern Province of Panamá, Panamá.)

Small; with blue throat and light red, black-tipped bill.

Description.—Length 83-90 mm. Tail shining golden bronze on both upper and lower surfaces. Sexes alike, back and wing coverts metallic green; crown similar, but appearing darker as the feathers are tipped lightly with dusky; lower rump and upper tail coverts rather dull reddish brown; tail glittering golden bronze above and below; wings dusky with a faint purplish sheen; chin cinnamon-buff; lores and foreneck to upper breast iridescent violet-blue; sides of breast and under wing coverts light metallic green; center of breast dull buff; under tail coverts gray bordered with clay color.

A male taken January 8, 1965, on Isla Gobernadora, had the iris dark brown; bill light red, with tip of maxilla and of mandible black; tarsus, toes, and claws slaty black. Another male collected February 16, 1966, near Puerto Armuelles, Chiriquí, had the iris Verona brown, tip of the bill black, the rest deep red; tarsus and toes fuscous-black, claws black.

Measurements.—Males (17 from Panamá) wing 48.2-51.8 (49.7), tail 25.6-28.1 (26.7), culmen from base 17.0-19.6 (18.2) mm.

Females (6 from Panamá), wing 46.4-49.8 (47.7), tail 25.2-27.2 (25.9), culmen from base 18.6-20.0 (19.4, average of 5) mm.

Resident. Found locally in small numbers on the Pacific slope from Chiriquí through Veraguas, the Azuero Peninsula, and the eastern Province of Panamá to eastern Darién; also in the lower Chagres Valley in the Atlantic drainage. Isla Coiba; Isla Ranchería; Isla Gobernadora.

The bird is recorded in western Chiriquí from near Puerto Armuelles, Bugaba, Divalá and David, and once by Bangs (Proc. New England Zool. Club, vol. 3, 1902, p. 29) at 900 meters near Boquete. Specimens in the California Academy of Sciences were taken by Mrs. Davidson at Puerto Armuelles, Concepción, and near San Félix. In Veraguas, Arcé early secured a specimen at Chitra. Aldrich found it common at Paracoté, near the head of Golfo de Montijo, and secured 1 inland at 600 meters on Cerro Viejo. I col-

lected 1 on Isla Gobernadora, and 1 on February 26, 1957, at Ensenada Venado, on the southern end of the Azuero Peninsula.

One of the very early records is by Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 7, 1862, p. 465) of 1 forwarded by McLeannan when he was stationed at Lion Hill on the Panama Railroad. Jewel collected a male at Gatun, Canal Zone, July 28, 1912. There are numerous sight records at the flowering shrubs near the laboratory on Barro Colorado Island. Elsewhere this hummingbird has been recorded only on the Pacific slope.

On Cerro Chucantí, in eastern Panamá, I found 1 male at 500 meters, and secured another lower down. A third was collected at Charco del Toro on the Rio Majé. One that I took along the Quebrada Fundadero near Jaqué, Darién, on April 4, 1946, marked a considerable extension of the known range. My main experience with them was on Isla Coiba in January and early February, 1956, as there they were common.

The goldentail is a forest inhabitant that seeks shaded haunts to perch, usually on the lower branches. On Coiba they ranged also in mangroves and in swampy woodlands near the mouths of the rivers. However, they came constantly to flowering shrubbery in the open, especially to the guayabos. There they were continually pugnacious to other species of the family, as well as among themselves. As they move about, the light, reddish base of the bill identifies them, for it shows prominently even in the shadowed depths of the forest. In the sun a glint of reflected light from the tail is seen.

A female taken on Isla Coiba, January 24, 1956, was laying.

HYLOCHARIS GRAYI HUMBOLDTII (Bourcier and Mulsant):
Blue-headed Sapphire, Zafiro Cabeci-azul

Trochilus humboldtii Bourcier and Mulsant, Ann. Sci. Phys. Nat. Agr. Industr., Soc. Roy. Agr. Lyon, ser. 2, vol. 4, 1852, p. 142. (Río Mira, Esmeraldas, Ecuador.)

Medium size; base of maxilla and mandible reddish; crown and throat bright blue; female underneath white.

Description.—Length 100-105 mm. Male, crown, lores, and upper throat deep blue; rest of upper surface rather dark metallic green, somewhat bronzy on lower back; tail dark green, blackish at end, with lateral feathers tipped with light gray; wings dusky, with a faint purplish tinge; auricular region indistinctly dark brownish gray; center of lower breast, abdomen, and under tail coverts pure white; rest of under surface, including under wing coverts, glittering, some-

what brassy green, the feathers of the foreneck and upper breast basally white.

Female, above entirely dark shining green, with the crown feathers lightly edged with dusky; tail tipped with grayish white; wings grayish brown, with the primary coverts black; under surface white, with the sides shining green, and the lower breast and foreneck spotted with the same color.

Juvenile male, crown greenish black, with the feathers tipped narrowly with cinnamon; foreneck dusky, with the feathers edged indistinctly with white.

Measurements.—Males (9 from Darién, Colombia, and Ecuador), wing 61.4-64.7 (63.1), tail 32.0-35.5 (34.0), culmen from base 20.4-22.8 (21.4) mm.

Females (7 from Darién and Colombia) wing 58.2-61.6 (63.1), tail 31.5-34.0 (32.5), culmen from base 21.0-22.8 (22.1) mm.

Resident. Known in Panamá only from Jaqué, Darién.

Two males, 1 juvenile, and the other nearly in adult dress, and 2 females, collected near Jaqué from March 18 to April 11, 1946, are the first records for this species from Panamá. The birds were found singly near the mouth of the Río Jaqué, either at the border of the mangrove swamps or closely adjacent. One was feeding at flowers of *Tilia*. The race has been reported in western Colombia north only to the Serranía de Baudó in central Chocó, but from the records at Jaqué it must range north to the border.

GOLDMANIA VIOLICEPS Nelson: Goldman's Hummingbird,
Colibrí de Goldman

Goldmania violiceps Nelson, Smithsonian Misc. Coll., vol. 56, no. 21, July 8, 1911, p. 1. (Cerro Azul, Panamá, Panamá.)

Small; adult male green with violet-blue crown; female green above, white underneath; center of tail chestnut in both sexes.

Description.—Length 87-95 mm. Three central under tail coverts pure white, elongated, narrow basally, broadened distally, stiffened and recurved, projecting prominently below the normal green feathers on either side. Adult male, tenth outermost primary slightly shorter than the ninth, with the tip abruptly narrowed; crown, including forehead, metallic blue; rest of upper surface bright metallic green; tail chestnut edged widely with bronze; wings dusky with a purplish sheen; under surface bright metallic green, the feathers with a concealed white subterminal bar; femoral tufts white; under tail

coverts green, except for the three specialized feathers in the center, which are white.

Female, above, including wing coverts, light metallic green; wings fuscous-black, with a faint purplish sheen; tail as in male, but also tipped lightly with grayish white; central under surface light grayish white, with the sides spotted with light metallic green; femoral tufts and specialized central under tail coverts white, as in male.

Immature male, somewhat darker green above than female; under surface darker gray, spotted heavily throughout with glittering green.

A fully adult male, taken January 12, 1949, on Cerro Azul, had the iris dark brown; maxilla and tip of mandible dull black; base of mandible flesh color; feet dull dark brown; claws black. An immature male, collected February 24, 1964, on Cerro Malí, Darién, was similar, except that the base of the mandible was very pale brownish white, the gape was yellow, and the bare lower end of the tarsus and the toes were pale dull neutral gray. The inside of the mouth in this individual was dull black on the inner surface of the maxilla and of the tip of the mandible. The rest of the inside of the mandible and the tongue were dark honey yellow.

Measurements.—Males (15 from cerros Azul, Bruja, Malí, and Tacarcuna), wing 50.8-53.0 (51.7), tail 27.8-33.0 (30.1), culmen from base 16.7-21.4 (18.6) mm.

Females (9 from cerros Azul, Malí, and Tacarcuna), wing 47.5-49.0 (48.1), tail 25.1-28.0 (26.0), culmen from base 18.0-20.2 (18.9) mm.

Resident. Locally common in the Subtropical Zone in the mountains of eastern Panamá; recorded on Cerro Bruja, Cerro Azul, Cerro Tacarcuna, and Cerro Malí.

This is a forest species that on the Pacific side of the Cerro Azul comes in gallery forest as low as 600 meters, but is more common in denser growth up to 900 meters. On Tacarcuna it is most common in and around areas of cloud forest. It is probable that it will be found on the higher, forested peaks throughout the Serranía del Darién.

As their forest haunts have been little frequented by men, I have found them tame, and readily attracted by squeaking. At times they have alighted nearby, or again have hovered momentarily with softly humming wings, a beautiful sight, before they darted away. Males have a low, quickly uttered, chirping song. They were observed feeding at flowers.

The enlarged and stiffened central under tail coverts, clear white

in contrast with the darker feathers on either side, present a curious development, difficult to explain, as the structure is found in both sexes, though largest in adult males, and appears in first plumage in immature birds. At casual glance with birds in the hand the white feathers often suggest a bit of adherent dried excrement.

The species was named for Edward Alphonso Goldman of the Bureau of Biological Survey, naturalist on the Smithsonian Biological Survey of the Panama Canal Zone.

GOETHALSIA BELLA Nelson: Pirre Hummingbird, Colibrí Pirreño

Goethalsia bella Nelson, Smithsonian Misc. Coll., vol. 60, no. 3, September 24 (September 27), 1912, p. 7. (Cana, Cerro Pirre, Darién, Panamá.)

Small; tail, except central pair of feathers, cinnamon-buff tipped with greenish black.

Description.—Length 84-95 mm. Three or more of the central under tail coverts elongated, broadened, with thickened, curved shaft; inner secondaries cinnamon on basal half (as in *Eupherusa*). Male, lores and forehead chestnut, inner feathers in the latter area tipped with green; rest of upper surface, including wing coverts and upper tail coverts, metallic green, with a bronzy cast on the lower back and rump; two central rectrices bronze-green basally, others basally cinnamon-buff, all tipped with dull black, this reduced in amount on outer pair; inner secondaries cinnamon, tipped with fuscous-brown; wings fuscous-brown with a purplish sheen; edge of wing chocolate; chin cinnamon-buff; foreneck to abdomen, including sides and under wing coverts, shining, faintly bluish green; flank feathers basally pale cinnamon-buff to white, in part tipped with green; all of the under tail coverts pure white.

Female, dorsally like male, except that the forehead is green like the rest of the crown; lores chestnut; under surface light cinnamon-buff, shading to whitish on upper foreneck and upper breast.

In dried skins the maxilla and tip of mandible are dull black; base of mandible pale dull brownish white.

Measurements.—Males (4 specimens) wing 52.0-54.2 (53.0), tail 29.0-33.1 (30.4), culmen from base 17.4-18.2 (17.8) mm.

Female (1 specimen), wing 52.7, tail 27.3, culmen from base 18.3 mm.

Resident. Known in the Subtropical Zone on Cerro Sapo, and Cerro Pirre, Darién; south on the ridge of Pirre to the high valley on the eastern slope of the Alturas de Nique (head of Río Salaquí), Chocó, Colombia.

This interesting hummingbird was one of the important discoveries during Goldman's work on Cerro Pirre in 1912. His first specimen, a female, was taken March 6 at 1,525 meters elevation on the head of the Río Limón. A male was secured near this same point but a little lower at 1,375 meters on May 1. In the meantime he secured an adult male at 600 meters near Cana on March 16. These specimens were the basis of the original description by Nelson. The species was obtained next by Oliver Pearson, who secured 1 in 1938 on Cerro Pirre, a male, on March 29. The specimen is in the Academy of Natural Sciences in Philadelphia. The Academy also has another (sex not marked, but apparently a female) collected by Dawson Feathers at 900 meters on Cerro Sapo, above Garachiné, on May 3, 1941, during the Fifth George Vanderbilt Expedition. Dr. Pedro Galindo has sent me a male caught on August 18, 1965, in a mist net set above the old site of Cana on Cerro Pirre.

The only available information on this species in life is a brief mention in Goldman's notes that his specimens were taken while feeding at flowers.

This hummingbird resembles *Goldmania violiceps* in specialization of the central under tail coverts, which in *Goethalsia* are even longer and larger than in the other genus, as the modified area involves some of the shorter feathers on either side. The wing differs, as the tenth outer primary in *Goethalsia* is definitely longer than the one adjacent, and is not narrowed at the tip.

The birds range the length of Cerro Pirre, as indicated by 2 others collected by Oliver Pearson in 1938, a male on April 6, now in the American Museum of Natural History, and another (sex ?, probably ♀) on April 7, in the Academy of Natural Sciences, both marked "15 mi. s. of Mt. Pirre." From information received in correspondence with Dr. Pearson, it has been learned that the locality is in the head of the valley on the eastern side of the Alturas de Nique at the southern end of the Pirre massif. These 2 specimens, therefore, are from Chocó on the Colombian side of the international boundary.

Dr. Nelson named the genus in honor of Colonel George W. Goethals, head of the Panama Canal Commission, in recognition of his assistance to the naturalists, including E. A. Goldman, engaged in the Biological Survey of the Canal Zone.

AMAZILIA DECORA (Salvin): Charming Hummingbird, Colibrí Encantador

Polyerata decora Salvin, Ann. Mag. Nat. Hist., ser. 6, vol. 7, April 1891, p. 377.
(Southern slopes of Volcán de Chiriquí, Chiriquí, Panamá.)

Small; like *A. amabilis*, but bill longer; male, with glittering crown cap extended over nape.

Description.—Length 96-104 mm. Male, entire crown from forehead to nape shining metallic green; sides of head, back, and wing coverts metallic bronze-green; rump darker, more bronze; upper tail coverts olive-bronze; central rectrices dull olive-bronze (blackier than in *A. amabilis*); lateral tail feathers dusky, faintly bronze; wings dusky, with a purplish sheen; chin sooty, tipped faintly with green; lower foreneck bright metallic blue; upper breast, sides, and under wing coverts dull metallic green; lower breast dull green, with the feathers margined with brownish gray; abdomen and middle line of breast light brownish gray; under tail coverts olive-gray margined with white.

Female, like that of *A. amabilis*, but crown brighter, more shining bluish green than rest of upper surface; rump, upper tail coverts, and central rectrices darker.

Juvenile, crown concolor with back; green of under surface duller.

An adult male, collected at Puerto Armuelles, Chiriquí, February 11, 1966, had the iris dark brown; maxilla and tip of mandible black; basal two-thirds of mandible pinkish white; tarsus and toes fuscous; claws black.

Measurements.—Males (10 from western Panamá and Costa Rica), wing 53.5-55.7 (54.6), tail 26.5-31.8 (29.6), culmen from base 21.5-24.4 (22.7) mm.

Females (10 from western Panamá and Costa Rica), wing 50.0-52.8 (51.7), tail 25.7-29.0 (27.5), culmen from base 22.5-25.7 (23.4) mm.

Weight, 7 males, 4.74 ± 0.14 grams (Hartman, Auk, 1954, p. 468.)

Resident. Fairly common in western Chiriquí from the lowlands to 1,580 meters in the mountains.

Like the companion species *Amazilia amabilis*, this is a forest inhabitant, found feeding at flowers, but quietly, as usually they are not conspicuous.

The first specimens reported from Panamá were collected by Arcé on the southern slopes of Volcán de Chiriquí and at Bugaba, but for many years these birds were confused with the more common *amabilis*. Following the description of *decora* by Salvin, W. W. Brown, Jr., secured a small series at Divalá in November 1900 (Bangs, Auk, 1901, p. 359). Batty also collected it near Boquerón the following year. A series in the California Academy of Sciences was taken by Mrs. Davidson at Puerto Armuelles in November 1929,

with 1 at Concepción on December 5. I found it fairly common at Armuelles and also higher near El Volcán, and at Santa Clara to the west. Apparently it is more abundant in southwestern Costa Rica where its range extends to the lower Río Grande de Tárcoles. It is confined wholly to the Pacific slope in both republics, and is found from the lowlands to the Subtropical Zone.

The males of *decora*, compared to those of *amabilis* differ in larger bill, which is longer in addition to being broader, especially at the base. Furthermore, the entire body averages slightly larger. The glittering green area of the crown cap is much larger as it extends back to the nape, and also is wider as it covers the entire crown. The rump, upper tail coverts and the tail are darker, less bronze. The female is glittering green on the crown in contrast to the back, in addition to its longer, heavier bill. Recent treatment has listed *decora* as a geographic race of *amabilis*, but after examination of a large number of specimens it appears to me more in accordance with the facts to consider *amabilis* and *decora* a superspecies with each accorded specific status. There is no question as to their general resemblance, but I have found no individuals that show intergradation in the characters mentioned. The *amabilis* group throughout its extensive range is remarkably uniform, as is *decora* in its more restricted geographic area.

AMAZILIA AMABILIS (Gould): Lovely Hummingbird, Colibrí Hermoso

Trochilus amabilis Gould, Proc. Zool. Soc. London, pt. 19, 1851 (April 29, 1853), p. 115. (Colombia.)

Amazilia amabilis costaricensis Todd, Ann. Carnegie Mus., vol. 29, December 31, 1942, p. 330. (El Hogar, Costa Rica.)

Small; male, chin and breast green, foreneck blue, crown glittering green; female, under surface white, spotted with light green; rump and upper tail coverts bronze-green.

Description.—Length 88-95 mm. Central rectrices definitely broader than lateral pairs. Male, crown brilliant metallic green; occiput, sides of head and neck, back and wing coverts metallic bronze-green; rump bronze; upper tail coverts and middle pair of rectrices purplish bronze; rest of tail blue-black, in some with grayish white tips; wings dusky with a violaceous sheen; chin and upper throat dull metallic green, with the feathers tipped with dusky; lower foreneck metallic violet-blue; upper breast, sides, and under wing coverts dull metallic green; narrow median line of breast and abdomen light brownish

gray; under tail coverts dark gray edged with grayish white; femoral tufts white.

Female, above like male, but with crown duller metallic green; under surface somewhat dull white or grayish white, spotted with metallic green, in some the spots more bluish across the breast; outer tail feathers tipped with gray.

Juvenile, throat dusky gray, with the feathers edged narrowly with pale buff.

An adult female, taken at Armila, San Blas, March 5, 1963, had the iris mouse brown; maxilla and tip of mandible black; base of mandible pale dull red; tarsus, toes, and claws black.

Measurements.—Males (14 from Panamá), wing 52.8-55.7 (53.8), tail 27.1-31.0 (29.0), culmen from base 17.5-19.8 (18.9) mm.

Females (12 from Panamá), wing 49.4-52.6 (50.9), tail 25.5-28.7 (27.0), culmen from base 19.0-20.3 (19.6) mm.

Weight, 1 male, 4.78 grams; 3 females, 3.76, 3.8, 3.98 grams (Hartman, Auk, 1954, p. 468).

Resident. Fairly common on the Caribbean slope from western Bocas del Toro to far eastern San Blas, and on the Pacific side throughout the eastern sector of the Province of Panamá and Darién, to an elevation of 600 meters near Cana on Cerro Pirre.

This is a widely distributed hummingbird, found throughout the tropical lowlands, absent only on the Pacific slope from the Canal Zone westward. As this range implies, it is a bird of forested areas though in feeding it comes to flowering trees, as the guayabo, in open areas. At these trees often many congregate, but elsewhere they are found alone. In the forest they glean regularly over leaves. In several I have found the throat filled with insects, mainly tiny diptera, but including ants and other small hymenoptera. Occasionally, I have heard males singing chirping, twittering notes, sometimes apparently scolding me. I have not seen an account of the nest.

On a shaded quebrada near El Uracillo in northern Coclé one came to a little pool of clear, quiet water at my feet. Here it hovered above the surface, eyeing first me and then the water below, and then dipped in with a little splash. After perching for a minute with fluttering wings it repeated the bath several times, submerging until the water covered its back, all this fearlessly, though almost within reach of my hand.

To the north this species ranges through the Caribbean slope of Costa Rica and Nicaragua. To the south of Panamá it is found through western Colombia to Ecuador, and from the lower Atrato

to the lower Río Magdalena. Throughout this great area the birds appear uniform, aside from the usual amount of individual variation. In the extensive series of specimens now available the supposed differences on which Todd proposed a race for the Caribbean population east to the Canal Zone are not valid.

AMAZILIA EDWARD (De Lattre and Bourcier): Snowy-breasted Hummingbird, Colibrí Pechiblanco

Rather small; head and foreneck dark green; back bronze-green to coppery bronze; breast and abdomen clear white.

Description.—Length 92-100 mm. Adult male, crown, hindneck and upper back metallic green; lower back, rump, upper tail coverts and greater to lesser wing coverts bronze-green, bronze or coppery bronze; tail black to coppery bronze or tawny-brown (varying according to subspecies); wings, including primary coverts, dusky, glossed with purple to coppery brown; cheeks, foreneck, upper breast and sides glittering yellowish green, with feathers of foreneck and breast basally white; lower breast and abdomen pure white; under tail coverts dull gray centrally, bordered with white to cinnamon-buff; under wing coverts coppery green to green; edge of wing pale buff to cinnamon-buff.

Adult female, similar, but colors a little duller.

This is a common, widely distributed species mainly of the Pacific lowlands, usually found feeding at flowers. In the western area east to western Coclé, and including the eastern side of the Azuero Peninsula, individuals uniformly are slightly duller colored on the back, with the tail mainly bluish black. Through the western sector of the Province of Panamá they become progressively brighter bronze to coppery bronze on the back, with the tail changing to coppery-brown, dull rufous-brown, or to bronze-brown. The species is distributed also throughout the islands of the Archipiélago de las Perlas, where the individuals are duller colored, more like those of western Panamá.

In summary, the western population, *niveoventer*, is fairly stable in color characters over a broad area. Those of the eastern half of the Republic have brighter dorsal hues, and are more variable. There is intergradation between the two main groups over a somewhat restricted area in eastern Coclé and adjacent western Province of Panamá. As specimens accumulated in earlier years the variations noted above were evident so that several forms were described. With the larger, better distributed series now available a clearer view

of the population groups is evident, so that it has been appropriate to synonymize some of these earlier proposals. In the outline that follows, the six subspecies that have been described are reduced to four, namely, an eastern and a western race, with an intermediate group that connects them, and one in addition on the Pearl Islands and the Taboga group of islets.

These hummingbirds range in open forests, and shelter also in low *rastrero* in abandoned fields. They feed constantly at flowers, especially on those of shrubs and trees, and where blossoms are freshly open, the birds may gather in numbers with others of their family. They are active in movement, always pugnacious, even attacking large bees that come too near. In such congregations the present species is easily identified by the white of the lower breast and abdomen, which is in abrupt contrast with the green of the foreneck and chest. Occasionally, I have seen them hawking small diptera in the air. The stomachs of those that I have examined have been filled with remains of tiny flies, hymenoptera, and spiders.

AMAZILIA EDWARD NIVEOVENTER (Gould)

Trochilus (—?) *niveoventer* Gould, Proc. Zool. Soc. London, pt. 18, 1850 (February 28, 1851), p. 164. (Near David, Chiriquí, Panamá.)

Amazilia edward ludibunda Wetmore, Smithsonian Misc. Coll., vol. 121, no. 2, December 2, 1952, p. 16. (Pesé, Herrera, Panamá.)

Characters.—Tail blue-black, in some with a sheen of reddish brown; back duller, less coppery bronze-green; under tail coverts mainly dusky gray centrally, edged broadly with white.

Measurements.—Males (12 from Isla Coiba, Chiriquí, and Veraguas), wing 52.9-56.7 (54.3), tail 28.3-30.7 (29.4), culmen from base 18.0-19.8 (19.0) mm.

Females (10 from Isla Coiba, Chiriquí, Veraguas, and Herrera), wing 51.0-54.3 (52.5), tail 27.7-30.5 (29.2), culmen from base 18.7-20.5 (19.7) mm.

Weight, 12 males 4.97 ± 0.10 ; 8 females 4.43 ± 0.08 grams (Hartman, Auk, 1954, p. 468).

A male, taken at Las Palmitas, Los Santos, January 24, 1962, had the iris very dark brown; maxilla and tip of mandible black; distal end of tarsus, toes, and claws black.

Resident. Locally common from the Costa Rican boundary in Chiriquí east on the Pacific slope to western Coclé and the Azuero Peninsula, from sea level in the lowlands to 1,675 meters elevation on Volcán de Chiriquí; Bocas del Toro; Isla Coiba.

The subspecific name *niveoverter* was given by Gould to birds collected by Warszewicz near David, but in western Chiriquí this well-marked form is known mainly from the Subtropical Zone near El Volcán, and on the eastern side of the mountain in the Boquete region. At San Félix in the lowlands I found it common, and it is of regular occurrence in the low country from that point eastward. On the Azuero Peninsula it is common. There is a male in the Havemeyer collection at Yale, taken at Chiriquí Grande (labeled "Chiriquicito Grande," in error) Bocas del Toro, on May 4, 1927, by Austin Paul Smith, the only record for the Caribbean slope. The race ranges beyond Chiriquí into southwestern Costa Rica to Boruca and El General.

A nest (now in the U. S. National Museum) collected by Dr. F. A. Hartman (Condor, 1957, p. 270) near El Volcán, Chiriquí, March 14, 1956, is a small, deep cup of plant downs decorated externally with red and gray-green lichens. It was saddled in a crotch of a little branch in a small tree, about $2\frac{1}{2}$ meters above the ground. The collector gave the following dimensions: "outside diameter 48 mm.; outside depth 45; inside diameter 22; inside depth 24." The parent was identified, but the nest was empty.

The numerous specimens examined from throughout the extensive range are remarkably uniform in color, when the variability found in the other races is considered. Those from the eastern side of the Azuero Peninsula are slightly darker on the back, with lessened coppery reflection, which led to my description of a separate race from that area. With more material at hand it seems appropriate to group these as a minor variant of the present form.

This form of the species as stated is the race of western Panamá, found mainly on the Pacific slope. Occasional specimens, even from as far west as western Chiriquí, show a reddish brown tint, variable in amount, in some of the rectrices, occasionally of considerable extent. A similar variability is found in the typical race *A. e. edward*, in which some individuals have the rectrices very dark so that they suggest *niveoverter*. On close examination it is seen that these are merely a melanic phase, not to be identified as the western race. Records in literature of the subspecies *niveoverter* in the Canal Zone are based on an early report by Sclater and Salvin (Proc. Zool. Soc. London, 1864, p. 343) who in describing a collection made by McLeannan near Lion Hill on the Panama Railway list both *edward* and *niveoverter* without discussion. Salvin later (idem, 1870, p. 210) in an account of collections by Arcé made in Veraguas and Chiriquí

wrote under *niveoventer* that "we have a single specimen which was collected on the Panama Railway line by the late Mr. J. M'Leannan." I have examined this bird, now in the British Museum (catalog number 87.3.22.1881) and find that it has the label marked "Lion Hill Station, Panama Railway. 1863. McLeannan." The make of the specimen obviously is not that of McLeannan (familiar to me through the many specimens from his hand that I have handled). In fact it resembles the usual pattern of those prepared by Salvin. In view of other cases where localities on labels of the Salvin-Godman collection from Panamá obviously are wrong, I have not accepted this 1 specimen as a valid record for the Canal Zone.

AMAZILIA EDWARD COLLATA Wetmore

Amazilia edward collata Wetmore, Smithsonian Misc. Coll., vol. 121, no. 2, December 2, 1952, p. 17. (Head of Río Antón, near El Valle, Coclé, Panamá.)

Characters.—Similar to *Amazilia e. edward*, but darker green above, with much less coppery iridescence; tail dark reddish brown, intermediate toward *niveoventer*.

Measurements.—Males (10 from eastern Coclé and western Province of Panamá), wing 51.1-55.7 (53.4), tail 27.5-29.4 (28.9), culmen from base 19.0-21.3 (19.9) mm.

Females (5 from eastern Coclé and western Province of Panamá), wing 50.7-53.4 (51.7), tail 26.9-29.2 (28.0), culmen from base 19.9-21.0 (20.5) mm.

Resident. Eastern Coclé (El Valle) and the western sector of the Province of Panamá (east to La Campana and Capira).

This population is an intermediate link between *niveoventer*, long considered a separate species, and the more brightly colored typical *edward*.

I have found it common in the level area in the depression at El Valle, especially in the low brush that covered fields abandoned from cultivation within a year or two. Here they were feeding with much fighting, pausing to rest on open perches in the sun.

AMAZILIA EDWARD EDWARD (De Lattre and Bourcier)

Trochilus Edward De Lattre and Bourcier, Rev. Zool., vol. 9, September (November), 1846, p. 308. (Panama City, Panamá.)

Saucerrotia edwardi crosbyi Griscom, Amer. Mus. Nov., no. 282, September 12, 1927, p. 5. (Punta Garachiné, Darién, Panamá.)

Characters.—Tail distinctly rufous-brown, rarely darker; back coppery brown to reddish bronze; under tail coverts more or less buff;

some with sides slightly marked with cinnamon; average size, slightly smaller.

Measurements.—Males (10 from the Canal Zone, and the eastern sectors of the Provinces of Colón and Panamá), wing 51.0-53.8 (52.3), tail 27.4-29.4 (28.5), culmen from base 18.2-20.2 (19.6) mm.

Females (9 from the Canal Zone and the eastern sector of the Province of Panamá), wing 49.7-51.7 (50.3), tail 26.8-28.4 (27.5), culmen from base 18.0-21.4 (19.4) mm.

Weight (Hartman, *loc. cit.*, p. 468), 2 females, 4.0, 4.3 grams.

A male, collected at the La Jagua Hunting Club, March 23, 1961, had the iris dark brown; maxilla and tip of mandible black; rest of mandible dull pinkish white; lower end of tarsus and toes fuscous-black; claws black.

Resident. Locally common on the Pacific slope from the western boundary of the Canal Zone and adjacent western Province of Panamá (La Chorrera) east to the Tuira Valley (Boca de Cupe, Capetí), Darién; on the Caribbean slope from the lower Chagres Valley east to Portobelo, Colón.

There is variation in the extent and brightness of the coppery bronze color of the back throughout the range, but this is not correlated with distribution so as to allow recognition of two races in the geographic area concerned.

In view of the several subspecies now accepted in Panamá it is desirable to establish a definite type locality for the nominate race other than the "isthme de Panama" of the original description. As the first specimens, listed as collected by Ad. De Lattre in his tropical travels, cover this typical race, it may be assumed that they were taken near Panama City, which place, therefore, is designated as the restricted locality. A recent record for this area is of a male collected by Storrs Olson on February 1, 1963, about 3 kilometers east of Albrook Field.

The bird was named for Edward Wilson of London, a brother of Thomas Wilson, benefactor and President of the Academy of Natural Sciences in Philadelphia, in recognition of his collection of hummingbirds and of his interest in the family.

This subspecies is found on the Caribbean slope in the lower Chagres Valley, where McLeannan collected it, and where Salvin secured it near Obispo in April 1873. It has been collected from Gamboa to Juan Mina according to specimens at hand, and is recorded from Barro Colorado Island. A number are at hand from Gatun, and Goldman secured 1 at Portobelo, Colón, May 30, 1911.

From the Pacific side there are 2 in the American Museum of Natural History taken by W. B. Richardson at Chorrera, in the Province of Panamá, west of the Canal Zone.

The stomach of 1 collected by Goldman, I found filled with remains of small black hymenoptera. Another held small hymenoptera and a small spider.

Goldman recorded them in 1911 as one of the more common hummingbirds in the region between Gatun and Corozal, feeding especially at the flowers of the false banana or platanillo. He reported 1 bathing during flight by dipping bill, wings, and tail in the shallow water of a riffle in a stream, wetting itself and then perching to flutter and wipe its bill. One while resting on an exposed perch on a slender twig sang a squeaky song of two notes just alike, repeating the pair at brief intervals of a second or so. This was accompanied by turning the head and flitting the wings and tail.

Near the Río Mamoni, in the section known as Chepo Viejo, I found them common around flowers in low, rather open monte. They were perching here from 3 to 6 meters above the ground. In Zanja Limón 1 was attracted by my call and flew directly toward me with the light reflecting brilliantly from its green breast. In 1950, a few ranged along the Quebrada Cauchero on the lower slopes of Cerro Chucantí. One came regularly in evening below our camp to dart and poise over a pool in the stream in its capture of flying insects. One of our daily pleasures in this remote and primitive spot was the play of reflected light from the colorful plumage of this small bird that approached fearlessly as we worked and wrote in our open-sided shelter above the stream.

AMAZILIA EDWARD MARGARITARUM (Griscom)

Saucerottia edwardi margaritarum Griscom, Amer. Mus. Nov., no. 282, September 12, 1927, p. 4. (Isla Pedro González, Archipiélago de la Perlas, Panamá.)

Characters.—Tail varying from coppery green to dull rufous with a bronzy sheen; sides cinnamon-brown in most, especially in the females; back duller than in *A. e. edward*.

Measurements.—Males (11 specimens), wing 53.7-55.7 (54.4), tail 28.6-30.7 (29.4), culmen from base 18.2-20.6 (19.8) mm.

Females (10 specimens), wing 52.0-53.5 (52.6), tail 28.0-30.8 (28.9), culmen from base 19.7-21.6 (20.5) mm.

Resident. Found throughout the Archipiélago de las Perlas, (recorded from islas del Rey, Cañas, Saboga, Chapera, Bayoneta,

Pedro González, San José, and Santelmo) ; also from islas Taboga, Taboguilla, and Uravá off the Pacific entrance of the Canal.

This subspecies is widely distributed through the Pearl Islands in areas of open forest. On Isla San José I found them usually in the valleys of small streams, and also in the mangrove swamps. On the smaller islands they were scattered through the open woodlands. It has been interesting to record that the population of Isla Taboga off the Pacific entrance of the Panama Canal differs from that of the adjacent mainland and is like that of the Pearl Islands. Here, I recorded them in stands of dry, woody-stemmed growth standing tall in old fields, and also feeding at flowers, sometimes in the tops of the trees, occasionally in gardens in the town. They ranged also on the nearby smaller islands of Taboguilla and Uravá.

**AMAZILIA TZACATL TZACATL (De la Llave): Rieffer's
Hummingbird, Colibrí Colicastaño**

Trochilus Tzacatl De la Llave, Registro Trimestre, vol. 2, no. 5, January 1833, p. 48. (México.)

Of medium size, with tail chestnut brown.

Description.—Length 95 to 100 mm. Male, upper and under tail coverts, tail and lores chestnut-brown; tail tipped with bronze; rest of upper surface, including the wing coverts, and the upper breast and sides green; a small, partly or wholly concealed tuft of white on the center of upper sides; primaries and secondaries black with a slight sheen of purple; lower breast gray; abdomen and tibia white, the latter with the feathers elongated and fluffy.

Female, like male, but lower breast paler gray; feathers of throat and foreneck edged narrowly with dull white to produce a scalloped appearance (found also in lesser amount on the throat of some males).

Juvenile, lower breast and sides washed somewhat with cinnamon; feathers of lower back and rump tipped narrowly with chestnut-brown.

An adult male, taken January 7, 1962, at Chiva Chiva, Canal Zone, had the iris dark brown; distal half of the maxilla, the cutting edge back to the gape, and the tip of the mandible, dull black; rest of bill dull red; distal area of tarsus, toes, and claws dull black. In life the base of the bill, particularly in adult males, appears bright red, but this color becomes dull immediately when the bird is dead.

Measurements.—Males (10 from Panamá), wing 56.3-60.9 (58.8), tail 31.1-34.8 (33.2), culmen from base 21.1-24.9 (22.7) mm.

Females (10 from Panamá), wing 53.8-60.1 (55.8), tail 31.0-34.6 (32.5), culmen from base 23.3-24.8 (23.6) mm.

Weight, 12 males, 5.40 ± 0.10 grams; 10 females, 4.72 ± 0.10 grams (Hartman, Auk, 1954, p. 468).

Resident. Common throughout the tropical lowlands, from the Costa Rican boundary in Chiriquí and Bocas del Toro eastward, in lesser number in open areas of the Subtropical Zone to 1,600 meters on Volcán de Chiriquí, and to 1,000 meters in the Azuero Peninsula. Found on islands in the Gulf of Chiriquí (Parida, Bolaños, Brincanco, Canal de Afuera, Afuerita), Isla Coiba, Isla Ranchería, Isla Cébaco, Isla Gobernadora; islands in Laguna de Chiriquí (Colón, Pastores, San Cristobal, Bastamientos, Agua); Isla Taboga. Common on the Pacific slope to the eastern Province of Panamá (Chepo, El Llano), and on the Caribbean side through the Chagres Valley (to Candelaria on the Río Pequení, and Peluca on the Río Boquerón), and along the coast to Portobelo in eastern Colón.

While I have found no records from Darién or San Blas, the bird may occur there as the species is widely distributed in northwestern Colombia including northern Chocó (recorded at Unguía). In view of the occurrence on islands off the Pacific side of western Panamá it is interesting that this species does not extend to the Archipiélago de las Perlas.

The rufous-brown tail, clearly visible as the bird feeds in low shrubbery, identifies this species, the most widely distributed of its family in the lowlands of the Isthmus. In wilder areas these hummers are found along streams, back of beaches, and in more open border areas in general. Less often they may range in forests from near the ground to the more open air of the high tree crown. They are flower feeders and gleaners of insects on leaves and branches, and so find the borders of cultivated fields, low rastrojo, and other open areas attractive. These preferences draw them naturally to flowers planted about houses, so that it is common to see them in gardens and in plaza or park areas in towns. Smaller flowers are probed with the long bill as they hover on the wing. With those of larger size the hummers frequently perch on ends of the petals, or on adjacent blossoms, for ready access to these supplies of food. The stomach of 1 specimen taken at Portobelo held 3 small spiders and 5 myrmecine ants.

Males display from a perch in the sun, with spread tail and fluttering wings, while they utter a chirping, twittering song. They often chatter with double-noted calls when disturbed by entry in their

haunts during the pairing season. The species is one that comes regularly when small birds are called.

A nest with 2 eggs from Almirante, Bocas del Toro, taken March 29, 1962, by technicians of the Gorgas Memorial Laboratory, was a cup of felted, whitish plant down that averaged 5 mm. thick, with an outer covering of shreds and thin fibers of weathered brown plant materials, camouflaged by scattered bits of light green moss and gray-green lichen. It measured 50 mm. in diameter by 40 mm. tall, with an inside depth of 20 mm. The 2 white eggs were near hatching so that 1 was broken. The other measured 14.7×9.6 mm., dimensions that agree with the average of 14.0×8.8 mm. for 6, given by Skutch (Auk, 1945, p. 16). Two eggs in the British Museum collected in Antioquia, Colombia, by T. K. Salmon are dull white, without gloss, and long elliptical in form. They measure 13.3×8.9 , and 13.3×9.3 mm.

On Isla Coiba on January 8, 1956, I found a nest a little more than 2 meters from the ground on the horizontal branch of a small, broad-leafed tree in an open locality back of a beach. It was built of fine shreds of light grayish brown plant fiber, with somewhat coarser materials on the outer surface, decorated with a few bits of lichen. It measured 42 by 44 millimeters externally, being somewhat flattened by the 2 well-grown young that it contained. These had two lines of clay-colored down along the dorsal pteryla. The limb on which the nest rested was a passageway for numerous large ants so that the female remained with the young, striking with her bill at those of the insects that passed too near.

Stone (Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, pp. 255-256) in an account based on notes of L. L. Jewel, mentions a nest found near Gatun, April 30, 1912, that was placed "on the horizontal limb of a shrub five feet from the ground, a dainty cup of light yellow silky vegetable fiber, with a few gray lichens on the outside, all held together by a network of spider's webs." This contained 2 fresh eggs. Another found May 7, 1912, "about fifteen feet from the ground" held 1 egg and a young bird. Heath (Ibis, 1932, p. 483) at Barro Colorado Island recorded a nest placed at the tip of a horizontal branch. The young were reared successfully through heavy storms in spite of the exposed situation. At Changuinola, Bocas del Toro, January 30, 1958, I found a nest recently built a meter from the ground in a small shrub standing isolated on a lawn.

The nesting season may vary in some areas as I noted adult birds

in full molt at Pedasí, Los Santos, March 8, and on islas Bolaños and Parida February 1 and 2.

In agreement with the condition found in other of the smaller resident species on Isla Coiba, birds of both sexes of Rieffer's hummingbird average faintly darker when compared with specimens from the mainland. The deeper color is seen in the gray of lower breast and abdomen in all of the dozen specimens examined. While the average from elsewhere is paler there are numerous specimens equally dark so that the difference is not sufficiently clearcut to warrant separation by name.

The typical race *Amazilia tzacatl tzacatl* ranges from Tamaulipas in eastern México south through Central America to northern Colombia and northwestern Venezuela. The birds of southwestern Colombia, including Gorgona Island, and western Ecuador have the under tail coverts and tail paler brown, and are recognized as a separate form under the name *A. t. jucunda*.

AMAZILIA HANDLEYI Wetmore: Escudo Hummingbird, Colibrí Escudño

Amazilia handleyi Wetmore, Smithsonian Misc. Coll., vol. 145, no. 6, December 16, 1963, p. 3. (Isla Escudo de Veraguas, Bocas del Toro, Panamá.)

Like *Amazilia tzacatl* but much larger, and darker in color.

Description.—Length 118-123 mm. Adult (sexes alike), crown, back, lesser and middle wing coverts deep green, with dull russet iridescence; upper tail coverts liver-brown; tail chocolate, edged and tipped with dull black to purplish black; primaries, secondaries, and primary coverts dull black, with a faint violet sheen; a narrow line of chocolate on the lores; foreneck, upper breast, and sides clear bright green; small tufts of feathers near center of sides and lower abdomen, and the tibia white; lower breast and upper abdomen hair brown; edge of wing chocolate.

Measurements.—Males (4 specimens), wing 67.5-68.7 (68.1), tail 40.0-41.5 (40.6), culmen from base 24.4-27.6 (24.5) mm.

Female (1 specimen), wing 67.1, tail 41.1, culmen from base 25.8 mm.

Resident. Found on Isla Escudo de Veraguas, in the Caribbean off the base of the Valiente Peninsula, Bocas del Toro, Panamá.

In March 1958, during work on Isla Escudo, I had occasional distant glimpses of hummingbirds when they came briefly to feed at flowers in the low bushes that grew back of the beach. None were within gun range. As they showed a flash of brown in the tail I sup-

posed that they were Rieffer's hummingbirds (*Amazilia tzacatl tzacatl*), common on the adjacent mainland, and recorded them under that name in an account of the avifauna of the island (Wetmore, Smithsonian Misc. Coll., vol. 139, no. 2, 1959, p. 6).

In further studies of the fauna of Escudo, Dr. Charles O. Handley, Jr., of the U. S. National Museum, through cooperation of the U. S. Army visited the island in 1962, and lived there in a shore camp from March 20 to 24. Though his visit was directed toward collections of the mammals of the island, in addition he and his assistant Frank M. Greenwell, preserved a number of birds, some shot for specimens, and others caught in mist nets set for bats. Five of the hummingbirds referred to above as seen during my own visit in 1958 were captured in nets set across the mouth of the lagoon at the eastern end of the island. The specimens, preserved originally in formaldehyde, on their arrival in the museum were prepared as skins by Mrs. Roxie Laybourne. In the hand, it was obvious that, though they resembled Rieffer's hummingbird in brown tail and general color pattern, they were so much larger in all dimensions, especially in bulk of body, and so dark in color, that they represented a form previously unknown. *Amazilia tzacatl* in its wide distribution from eastern México to Colombia, northwestern Venezuela, and western Ecuador, as a species is uniform in size, with the only marked variation in color a wash of buff on the abdomen in the population of southwestern Colombia and western Ecuador (recognized as stated above as a subspecies *Amazilia t. jucunda*). In much greater size the five birds from Escudo are so different that this island group is treated as a separate species, distinction given further weight by the coloration, that has no approach in the birds of the mainland.

To make certain that the color differences were not due to the method of original preservation I placed a study skin of *Amazilia t. tzacatl* in the same fluid in which the hummingbirds from Escudo had been received. When dried after a month of immersion this specimen showed no signs of change, nor have any appeared in the 5 years that have followed to the time when the present account was written.

The feathers along the side of the neck when the birds were wet from the original preservative appeared metallic reddish purple, a color that disappeared completely as the birds dried. The same color appeared in this area of the neck in the skin of *Amazilia t. tzacatl* when the preservative wet its feathers. This also disappeared when the specimen again was dry.

The hummingbird of Escudo de Veraguas was named for Dr. Charles O. Handley, Jr., in recognition of his continued interest in the avifauna of the Isthmus during his extended studies of the mammals of Panamá.

EUPHERUSA EXIMIA EGREGIA Sclater and Salvin: Stripe-tailed Hummingbird, Colibrí Colirrayado

Eupherusa egregia Sclater and Salvin, Proc. Zool. Soc. London, October 1868, p. 389. (Castillo and Calovévora, Veraguas, Panamá.)

Of medium size; with a prominent bright brown spot on the secondaries; outer tail feathers white with black tip (in male); wholly white (in female).

Description.—Length 93-105 mm. Adult male, upper surface metallic green, in some bronze-green; two central pairs of rectrices bronze-green to black; others white, edged with black on outer web of outer pair, tipped broadly with black in all; primaries dull black, with a purplish sheen, the inner ones cinnamon-rufous at base; secondaries prominently cinnamon-rufous, tipped with dusky; under surface, including under wing coverts, bright grass-green to yellowish green; edge of wing cinnamon-rufous; feathers on foreneck and center of breast with a concealed bar of white; femoral tufts and under tail coverts white.

Adult female, like the male, but with cinnamon-rufous of secondaries reduced; outer rectrices wholly white; under surface white to grayish white, spotted or glossed laterally with metallic yellowish green; under tail coverts white, as in male.

Immature, male, under surface grayish to dull bronze-green, whiter posteriorly.

In the male, the iris is dark brown; bill black, with the base in some dull vinaceous; tarsus and toes dull dark brown; claws black.

Measurements.—Males (10 from Panamá), wing 57.5-60.0 (58.9), tail 31.4-34.8 (33.6), culmen from base 18.5-20.6 (19.7) mm.

Females (10 from Panamá and Costa Rica), wing 54.0-56.8 (55.0), tail 30.2-32.8 (31.9), culmen from base 19.3-21.1 (20.0) mm.

Weight, 5 males, 4.35 ± 0.10 grams (Hartman, Auk, 1954, p. 468).

Resident. Locally fairly common on the Pacific slope from 1,200 to 2,500 meters in the Subtropical Zone, from the Costa Rica boundary in Chiriquí east to eastern Veraguas. Recorded also from the Caribbean side on the upper Río Changuena, Bocas del Toro, and Calovévora, northern Veraguas.

A male (no. 481638) in the American Museum of Natural History

collected by H. J. Watson is labeled "Bogava, Chiriquí, 800 feet." The label is that of the dealer Rosenberg, though the writing is that of Watson. As the locality is in the hot lowlands, far distant from the usual range in mountain forests, the record is open to question.

Most of the specimens that are known have been taken in western Chiriquí from the slopes of the great volcano, and the Cerro Pando adjacent. I have found them feeding at flowers near the ground, where they impressed me by their active movements. They range in forest, but on the higher slopes may come out into more open localities when attracted by plants in blossom. In the original description the locality "Castello" for one of the specimens should have read Castillo. As Arcé secured 1 at Calovévora, northern Varaguas, and Galindo collected 1 on the upper Río Changuena in the mountains of Bocas del Toro it is probable that these birds range along the higher ridges of the Caribbean slope as well as on the Pacific side.

The race *egregia* extends through the mountains of Costa Rica where Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 157) reports it mainly from the Caribbean drainage. Typical *E. e. eximia*, found from Nicaragua north to Chiapas, differs in slightly smaller size. In addition, the outer rectrix in the male has the outer web completely black, and in the female is broadly tipped with black.

EUPHERUSA NIGRIVENTRIS Lawrence: Black-bellied
Hummingbird, Colibrí de Barriga Negra

Eupherusa nigriventris Lawrence, Proc. Acad. Nat. Sci. Philadelphia, 1867 (1868), p. 232. (Costa Rica.)

Small; outer tail feathers white; partly concealed bright brown spot on the secondaries; male black below.

Description.—Length 70-80 mm. Adult male, above from the occiput to the rump, including the lesser and middle wing coverts, bronze-green; feathers of crown edged narrowly with dull black; upper tail coverts dull bronze; middle rectrices dull black glossed with bronze; outer pairs white; wings dusky, with a purplish bronze reflection; secondaries basally cinnamon-brown, with the tips more or less dusky, forming a partly concealed spot; forecrown, forehead, sides of head, and under parts black; sides and under wing coverts bronze-green; edge of wing cinnamon-brown; under tail coverts white.

Adult female, above metallic bronze-green; upper tail coverts more definitely bronze; wings as in male, but with cinnamon spot on the secondaries less evident; foreneck, breast, and abdomen grayish white; under tail coverts white.

Measurements.—Males (11 from Costa Rica and Panamá), wing 47.4-51.3 (49.5), tail 26.0-28.9 (27.3), culmen from base 14.5-16.5 (15.4) mm.

Females (10 from Costa Rica and Panamá), wing 45.6-47.6 (46.5), tail 25.3-27.4 (26.3), culmen from base 14.4-16.9 (15.5) mm.

Resident. Found in the Subtropical Zone of the high Caribbean slope, between 1,500 and 2,100 meters elevation, in Bocas del Toro and northern Veraguas.

This small hummingbird at present is little known. W. W. Brown, Jr., collected the first reported from Panamá in the Caribbean slope forests of Bocas del Toro, beyond Boquete, in June 1901 (Bangs, Proc. New England Zool. Club, vol. 3, 1902, p. 29). Mönniche secured a male at Camp Holcomb, in this same area, July 15, 1935 (Blake, Fieldiana: Zool., vol. 36, 1958, p. 518). From Veraguas, Arcé forwarded specimens taken on the Cordillera del Chucú beyond Santa Fé. One that he collected, now in the British Museum, marked from Calobre, must be wrongly labeled, as that point, at the base of the mountains on the Pacific side northeast of Santiago, is far down in the tropical lowlands, only 250 meters elevation above sea level.

The black-bellied hummingbird is an inhabitant of humid forests on the higher slopes of the mountains. As yet little is reported on its habits. Dr. Alexander Skutch (Publ. Nuttall Orn. Club, no. 7, 1967, pp. 40-41) at Montaña Azul, in the Cordillera Central of Costa Rica, found a female building a nest, on July 31, 1937, about 2 meters from the ground in a shrub standing in second growth. The small cup, sheltered from frequent rains by broad leaves above, was made "chiefly of brown scales (ramenta) from the fronds of large ferns . . . sparingly decorated on the outside with bits of moss and lichens. Much more moss was attached to the exterior after the eggs were laid." The 2 tiny white eggs hatched after about 16 days incubation. A second nest was built in forest on a horizontal branch of a shrub about 4 meters from the ground. On March 1, 1938, when found, it held 2 naked nestlings.

ELVIRA CHIONURA (Gould): White-tailed Emerald, Colibrí Coliblanco

Trochilus (Thaumatias?) chionura Gould, Proc. Zool. Soc. London, pt. 18, 1850 (Feb. 28, 1851), p. 162. (Base of Volcán de Chiriquí, 600-900 meters elevation, north of David, Chiriquí.)

Small; tail pure white, with broad dark tip.

Description.—Length 80-88 mm. Adult male, above, including the

inner primary coverts, metallic green, in some with a bronzy sheen; wings, including outer primary coverts, dull black with a purplish sheen; central rectrices bronzy metallic green; outer pairs pure white tipped broadly with greenish black; foreneck, breast, sides, and under wing coverts bright metallic green; a narrow line in center of breast, abdomen, and under tail coverts white; outermost under tail coverts in some spotted with metallic yellowish green.

Adult female, above like the male, but with the black ends of the outer rectrices tipped narrowly with white; under surface white, with the sides metallic green; under wing coverts and a variable amount of spotting on the breast also metallic green, these markings on the throat and foreneck, where present, lesser in size.

Immature female like adult, but foreneck and upper breast pale gray; green spotting on sides of neck duller, reduced in amount.

Measurements.—Males (12 from Panamá), wing 49.4-52.9 (51.8), tail (26.8-29.0 (27.9), culmen from base 15.9-17.9 (16.6) mm.

Females (12 from Panamá), wing 44.6-48.6 (46.5), tail 24.7-26.7 (25.6), culmen from base 15.0-17.7 (16.6) mm.

Weight, 1 male, 2.93 grams; 1 female, 2.83 grams (Hartman, Auk, 1954, p. 468.)

Resident. Fairly common in the mountains on the Pacific slope, from the Costa Rican boundary in western Chiriquí through Veraguas to eastern Coclé (El Valle), at 750 to 1,675 meters elevation.

The male and female from which this species was named, taken by Warscewicz, are said to have come from "Chiriquí near David, province of Veragua, at an altitude of from 2000 to 3000 feet," which would place the type locality on the southern base of the Volcán de Chiriquí, near the old trail leading down from modern Boquete. The records do not range above 1,675 meters so that the report of one taken by W. W. Brown, Jr., (Bangs, Proc. New England Zool. Club, vol. 3, 1902, p. 29) at "7,700 feet" (about 2,346 meters) is open to question. The localities of Batty specimens marked from islas Gobernadora and Cébaco without question are wrongly labeled. Mrs. Davidson secured the species on Cerro Flores, and on the ridge called Chame to the south of it, in eastern Chiriquí. Specimens in the British Museum taken by Arcé are labeled from Calovévora, Veraguas. The most eastern record is of a male that I collected March 29, 1951, a little below the summit of Cerro La India Dormida above El Valle, Coclé.

I have found these hummingbirds in forest where they fed at flowers in the undergrowth, moving rapidly from blossom to blossom.

Occasionally I heard them utter low squeaky calls. Sometimes they hold the feathers in the tail tightly folded, and the main feather covering close against the body, so that they present a markedly slender silhouette. But it is more usual to identify them by a flash of white as they spread the tail.

To the west this species ranges on the Pacific slope of southwestern Costa Rica, where it is reported from the Dota mountains southward. Available records from Panamá are from the Pacific slope, except for specimens in the British Museum taken by Arcé with the locality indicated as Calovévora. This species is closely allied to *Elvira cupreiceps* (Lawrence) of the Caribbean slope of Costa Rica, which differs in more coppery green above, particularly on the crown, and in a more definitely curved bill.

MICROCHERA ALBOCORONATA ALBOCORONATA

(Lawrence): Snow-cap, Gorra Blanca

Mellisuga albo-coronata Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 6, October 1855, p. 137, pl. 4. (Belén, Veraguas, Panamá.)

Small; male, entire crown white; female, under surface, including sides, plain white.

Description.—Length 58-66 mm. Adult male, crown white; nape and hindneck purplish black, changing to metallic reddish purple on back and wing coverts, brighter on rump and upper tail coverts; middle rectrices metallic bronze; others white at base, with terminal third black; wings dull black with a purplish sheen; side of head and under surface black glossed with reddish purple; under tail coverts white.

Adult female, upper surface metallic green, changing to bronze on upper tail coverts and central rectrices; other tail feathers white at base, broadly black at end, tipped with white; under parts pale grayish white.

Immature male, like female, but with a narrow line of white above the eye; under surface changing early, as the bird matures, to purplish black.

Measurements.—Males (10 from Veraguas), wing 39.5-42.5 (41.1), tail 18.2-21.0 (19.3), culmen from base 11.7-13.6 (12.6) mm.

Females (3 from Veraguas), wing 39.7-40.5 (40.2), tail 17.6-19.7 (18.9), culmen from base 12.1-12.5 (12.3, average of 2) mm.

Resident. Known only from the Caribbean slope of Veraguas.

In the original description of this small species Lawrence (*loc. cit.*,

pp. 2-3) includes the following information from Dr. J. K. Merritt, who presented the specimens:

"It was also in the Autumn of 1852, while stationed in the district of Belen, Veraguas, New Granada, that I obtained several specimens of this diminutive variety of the Humming-Bird family.

"The first one I saw, was perched on a twig pluming its feathers. I was doubtful for a few moments whether so small an object could be a bird, but upon close examination I convinced myself of the fact and secured it. Another I encountered while bathing, and for a time I watched its movements before shooting it,—the little creature would poise itself about three feet or so above the surface of the water, and then quick as thought dart downwards, so as to dip its miniature head in the placid pool, then up again to its original position, quite as quickly as it had descended.

"These movements of darting up and down, it would repeat in rapid succession, which produced not a moderate disturbance of the water, for such a diminutive creature. After a considerable number of dippings, it alighted on a twig near at hand, and commenced pluming its feathers."

It is pertinent to review some early published reports of this bird as they include an error in locality. Salvin (Proc. Zool. Soc. London, 1867, p. 154), in an account of collections received from Arcé, discusses the characters of typical *albocoronata*, but indicates merely that his material is from Veraguas. In a later paper (idem, 1870, p. 207) he lists his specimens as from Cordillera del Chucú, which is accepted as correct. The locality is not found on the map published with Salvin's paper, but is one, that from some of the species listed of known Caribbean range, must have been on the old trail that led from Santa Fé on the Pacific slope over a low pass to Mineral in the Atlantic side lowlands. Salvin and Godman in their final publication (Biol. Centr.-Amer., Aves, 1892, p. 268) through oversight gave the records of Salvin, 1867, as from "Santiago de Veraguas," a locality far down in the lowlands on the Pacific side, an obvious error, but include the report of 1870 on the same material correctly as from Cordillera del Chucú. Part of the older specimens in the British Museum that I have examined have the erroneous locality "Santiago de Veraguas" in Salvin's handwriting.

It is probable that *Microchera albocoronata parvirostris* (Lawrence), found on the Caribbean slope of Nicaragua and Costa Rica, may range into western Bocas del Toro. Dr. Eugene Eiseemann informs me that there is a specimen in the Havemeyer collection at Yale taken near Suretka, Costa Rica, only a few kilometers from the boundary with Panamá. A male of *parvirostris* in the American

Museum of Natural History is labeled "Veragua Arcé ex Boucard." This is too uncertain to accept as a valid record for Panamá, especially since Arcé made collections in Costa Rica before he came to the Isthmus. The male in this race is definitely reddish purple above and below and, with the female, has the amount of white in the tail reduced in comparison to what is found in typical *albocoronata*.

CHALYBURA BUFFONII MICANS Bangs and Barbour: Black-billed Plumeleteer, Colibrí Verde de Buffon

Chalybura buffonii micans Bangs and Barbour, Bull. Mus. Comp. Zool., vol. 65, September 1922, p. 204. (Cerro Sapo, Darién, Panamá.)

Large; under tail coverts long, broad, pure white; bill black.

Description.—Length 118-127 mm. Under tail coverts greatly enlarged and elongated, extended distally to center of tail or beyond. Adult male, above dark metallic green, including the outer webs of the inner primary coverts, and all of the other wing coverts; feathers of crown margined narrowly with dusky; upper tail coverts more or less bronze; rectrices dark blue-black, occasionally with the outer webs of the central pairs somewhat greenish bronze; wings and outer primary coverts dull brownish slate with a purplish sheen; under surface metallic grass green, the individual feathers with a subterminal bar of grayish white to white, these appearing as narrow, partly concealed scales; under wing coverts metallic grass green; femoral tufts, lower abdomen and under tail coverts white.

Adult female, like the male, but side of head below eye and under surface light gray spotted or washed on sides with light metallic grass green, this color in some extended over most or all of the foreneck and breast; rectrices, except the central pair, tipped lightly with grayish white; lower abdomen and under tail coverts as in male.

Immature male, like the adult, but partly grayish green across sides and breast.

An adult male, taken January 7, 1962, at Chiva Chiva, Canal Zone, had the iris dark brown; bill entirely black; bare lower end of tarsus and toes blackish brown; claws black. An adult female, collected January 12, 1963, at the same place, was similar except that the lower end of the tarsus was fuscous, with the upper surface of the toes also fuscous, and the under surface white. An immature female at Pucro, Darién, February 9, 1964, differed only in having the gape honey yellow.

Measurements.—Males (11 from Panamá), wing 67.6-70.8 (69.1), tail 41.4-45.2 (43.4), culmen from base 25.2-28.0 (26.7) mm.

Females (10 from Panamá), wing 62.0-64.6 (63.4), tail 36.6-39.4 (38.0), culmen from base 25.6-27.4 (26.1) mm.

Weight, 1 female 5.6 grams (Hartman, Auk, 1954, p. 468.)

Resident. Fairly common in the Pacific lowlands from the Province of Panamá (west to La Campana), and the Canal Zone, east to Cerro Sapo, and the Sambú, Tuira, and Chucunaque valleys, in Darién; ranging in the Canal Zone to the Caribbean slope in the lower Chagres Valley (Juan Mina, Barro Colorado Island); to 600 meters elevation on Cerro Pirre (Cana).

This is a bird of the forest that in the savanna areas ranges among the trees that line the water courses or border swampy areas. Below Chepo, in the area called Porcada Valdez, I found them around the blossoming guayas; and elsewhere saw them feeding at various flowers in the undergrowth. As they move the broad white feathers of the undertail coverts at times stand out clearly, a striking mark of identification. From the stomachs of 3 that Goldman collected at Cana I identified remains of small insects, among which were beetle fragments of the families Hydrophilidae and Scolytidae, many small hymenoptera and diptera, and bits of a jassid.

As a species, *Chalybura buffonii* ranges from central Panamá through northern and central Colombia to western Venezuela. The population of Panamá appears distinct in the dark, deeper blue of the central rectrices in both sexes. In a few individuals that I have seen these feathers have a faint edging of dull green, but this of slight amount. Adult males, compared with skins from central and northern Colombia, also are more bluish green on the lower surface. Adult females from Panamá are clearer white on the foreneck, breast, and abdomen. According to De Schauensee the race *micans* extends into northwestern Colombia.

Lesson (Les Trochilidées, 1832, p. 31, pl. 5) described *Trochilus buffonii* from a specimen of unknown locality which he believed came from Brazil, erroneously, however, as the species is not found that far south. Hellmayr and Seilern (Arch. Naturg., vol. 78a, pt. 5, 1912, p. 140) recognized this error, and as the original description and figure agreed with trade skins from Bogotá, designated that area as the type locality. Bogotá trade skins, and modern specimens from central Colombia that I have seen have the central rectrices bordered definitely with bronze to dull bronze-green. These are identified as the typical subspecies *C. b. buffonii*.

Todd (Ann. Carnegie Mus., vol. 29, 1942, pp. 331-332) from rather limited material has argued that Lesson's description and figure

agree with the birds of Panamá to which he applied the name *buffonii* with *micans* as a synonym. The additional specimens now available, however, support recognition of *micans* as a separate race. Birds from the lower Magdalena Valley and the Santa Marta region in Colombia east to northwestern Venezuela have the central rectrices decidedly brighter green. These are recognized as the separate race *aeneicauda* Lawrence.

**CHALYBURA UROCHRYSLA (Gould): Bronze-tailed Plumeleeter,
Colibrí Colibronceado**

Large; under tail coverts white and enlarged (but somewhat less so than in *C. buffonii micans*); base of mandible light-colored (reddish brown to pinkish white).

Description.—Length 110-120 mm. Adult male, above, including lesser to greater wing coverts, metallic green; lower rump and upper tail coverts coppery bronze; tail bronze-green; wings dusky with a purplish sheen; primary coverts mainly like wings, but in some individuals partly green; foreneck and upper breast dark blue to metallic green, changing to dull metallic green and slaty gray on abdomen; femoral tufts and enlarged under tail coverts pure white; under wing coverts dark green.

Adult female, above like the male; foreneck, breast, and abdomen gray; sides, including sides of neck, light metallic green; femoral tufts white; enlarged under tail coverts grayish white.

This species, easily distinguished by the light-colored base of the long, somewhat curved bill from the black-billed plumeleeter, its companion in the genus in Panamá, is equally common.

Two geographic races are found in the Republic.

CHALYBURA UROCHRYSLA UROCHRYSLA (Gould)

Hypuroptila urochrysla Gould, Mon. Troch., pt. 22, July, 1861, pl. 7 and text (= vol. 2, pl. 90 and text in completed book). (Western Colombia.)

Characters.—Male, distinctly light glittering green on foreneck and breast; tail dark blue, with only a faint wash of bronze on the central rectrices; female similar to that of *C. u. isaurae*, but faintly more yellowish green above, with the central rectrices clearer dark green, less bronzy.

Measurements.—Males (10 from Darién and Colombia), wing 68.2-70.9 (69.4), tail 42.1-45.6 (43.5), culmen from base 24.0-27.4 (25.5) mm.

Females (8 from Colombia and Ecuador), wing 62.5-64.2 (63.3), tail 37.0-40.0 (39.2, average of 7), culmen from base 24.5-26.9 (25.6) mm.

Resident. Found locally on the upper Río Jaqué (mouth of Río Imamadó), and on the lower slopes of Cerro Pirre (head of Río Setegantí at 450 meters, and Cana at 550 meters).

This, the common race of the species in western and northern Colombia, where it is widely distributed along the western coast, continues west from Chocó across the international boundary to the upper Río Jaqué. Here I secured 2 males feeding low in forest on March 29 and April 10, 1947. On Cerro Pirre, Goldman collected a male at 550 meters near Cana, June 4, 1912, and we netted a male at 450 meters elevation near the head of the Río Setegantí, February 1, 1961.

These are the only records known at present for this race in the Republic. The one taken by Goldman had the stomach filled with remains of insects, among which were those of a mosquito and other small diptera, bits of tiny beetles, including a staphylinid, and fragments of small hymenoptera.

CHALYBURA UROCHRYSA ISAURAE (Gould)

Hyppuroptila isaurae Gould, Proc. Zool. Soc. London, August 1861, p. 199. (Bocas del Toro, Panamá.)

Chalybura urochrysa incognita Griscom, Amer. Mus. Nov., no. 293, January 12, 1928, p. 3. (Tacarcuna, eastern Panamá = Río Tacarcuna, 575 meters elevation, Darién, Panamá.)

Characters.—Male, foreneck and breast metallic dark blue to somewhat greenish blue; male and female somewhat darker green above, and with the tail more definitely bronze.

In a male taken on the Río Tacarcuna, Darién, March 7, 1964, the iris was dark brown; maxilla and tip of mandible black; basal three-fourths of mandible dull pink; tarsus and toes pinkish white; claws black. Another male from the same place, collected March 14, 1964, was similar except that the tarsus and toes were light dull red. In a third male from Armila, San Blas, February 23, 1963, the base of the mandible was dark dull wine-red, and the tarsus and toes were dull red. A male taken at the Candelaria Hydrographic Station, Panamá, had the base of the mandible dull purple.

A female from the head of the Río Guabal, Coclé, March 2, 1962, had the iris dark mouse brown; maxilla and tip of mandible black; base of the mandible dull light brown; tarsus and toes light pinkish

white; claws black. Another female from Cerro Campana, Panamá, March 3, 1951, had the maxilla black; tip of mandible brownish black; base dull reddish brown. A third from Armila, San Blas, February 22, 1963, had the base of the mandible pale dull wine-red, and the tarsus and toes dull pink.

Measurements.—Males (10 from Colón, Panamá, San Blas, and Darién), wing 67.0-69.8 (68.4), tail 40.4-42.8 (41.3), culmen from base 23.6-26.9 (25.0) mm.

Females (10 from Coclé, Panamá, San Blas, and Darién), wing 62.0-64.8 (63.1), tail 36.4-39.8 (37.5), culmen from base 24.7-27.2 (25.9) mm.

Resident. Locally common in forest areas on the Caribbean slope from western Bocas del Toro, northern Veraguas, and northern Colón to eastern San Blas; recorded at 900 meters on Cerro Campana, western Province of Panamá, and at 575 meters on the upper Río Tacarcuna, Darién.

It is interesting that this race ranges to the Pacific slope on the crest of the mountain ridge at Cerro Campana, where *Chalybura buffonii micans* is found at the base. It crosses also to the Pacific side on the lower slopes of Cerro Tacarcuna, and is found across the higher levels which mark the divide on Cerro Azul. Elsewhere it is known only from the Caribbean side of the Isthmus.

The numerous specimens now available from the middle Chagres Valley (Candelaria Hydrographic Station), eastern San Blas (Armila, Puerto Obaldía), and the lower slopes of Cerro Tacarcuna, Darién, which all agree with *isaurae* of farther west, cover the range assigned to the supposed race *incognita*, described by Griscom, so that this is not recognized.

The distinct form *melanorrhoea* Salvin, of the Caribbean lowlands of Nicaragua and Costa Rica, may be found along the Río Sixaola on the western boundary of the Republic, as Carriker (Ann. Carnegie Mus., vol. 6, 1910, p. 536) records it as abundant on the Costa Rican side of that stream. Compared to *isaurae* the male has the under tail coverts black, and the foreneck and upper breast green. Females of the two forms are less distinctive, that of *melanorrhoea* being glossed with green on the sides (less extensively on the breast), with the under tail coverts and femoral tufts gray. The two intergrade in western Bocas del Toro, males of *isaurae* from this area often having the under tail coverts basally black. Eisenmann and Howell, in a detailed survey of these birds (Condor, 1962, pp. 300-310), show clearly that *melanorrhoea*, formerly considered specifically distinct, intergrades

with *isaurae* in this area in such a manner as to indicate that the former is a representative of the *urochrysis* complex. Though some from western Bocas del Toro are fairly close to the bird of Costa Rica the conclusion of these authors (*loc. cit.*, p. 305) was that "no examples of *isaurae* from Costa Rica could be discovered and no typical *melanorhoa* from Panamá, although intermediates occur in both countries."

On Cerro Campana these birds ranged in the heavy damp forest on the summit. Elsewhere they were found low down in forest in areas where the undergrowth was fairly open. Here they search twigs, and also hawk for small flying diptera. As they fly their wings produce a low humming sound, and often they utter squeaky, chirping calls. The white under tail coverts may show clearly as they move in the shadows of their haunts. A female caught in a mist net on the Quebrada Venado back of Armila, San Blas, February 22, 1963, was near breeding stage.

This attractive hummingbird is dedicated to Madame Isaure de Lafresnaye, wife of the well-known naturalist. Gould at the close of the original description wrote that the name was suggested to him by "my late highly valued friend the Prince Charles Lucien Bonaparte, who wished thus to convey a compliment to Madame la Baronne de la Fresnaye, the niece of Montbeillard, the able coadjutor of the celebrated Buffon."

**LAMPORNIS HEMILEUCUS (Salvin): White-bellied Mountain Gem,
Colibrí Serrano de Barriga Blanca**

Oreopyra hemileuca Salvin, Proc. Zool. Soc. London, 1864 (Feb., 1865), p. 584. (Turrialba, Costa Rica.)

Medium size; male, chin green, throat light blue, breast white; female, under parts white, sides spotted lightly with green.

Description.—Length, 95-110 mm. Adult male, forecrown, side of head and chin metallic emerald-green; occiput, back, rump, and smaller wing coverts metallic bronze-green; sides of occiput black; a white stripe on side of head behind eye; upper tail coverts and tail greenish bronze, tipped with dull buff; wings, including primary coverts, dusky with a purplish sheen; edge of wing pale cinnamon; throat shining purple-violet; sides and under wing coverts bronze-green; rest of under surface white, spotted laterally with bronze-green.

Adult female, like the male, but emerald-green of forecrown and side of head duller; chin and throat white like breast, spotted lightly with bronze-green.

Measurements.—Males (9 from Costa Rica, 1 from "Panamá"),

wing 62.6-66.1 (64.4), tail 35.2-37.7 (36.7), culmen from base 19.0-21.1 (20.1) mm.

Females (7 from Costa Rica, 1 from "Panamá"), wing 57.4-60.4 (58.3), tail 31.0-34.3 (32.6), culmen from base 20.6-22.3 (21.4) mm.

Status uncertain. Recorded from Chiriquí.

Inclusion of this species from western Panamá began with the statement by Hartert (Journ. f. Orn., 1900, p. 366), that "*Coeligena hemileuca* ist dem Tring-Museum neuerdings aus Chiriquí (Panamá) zugegangen." In the Rothschild collection in the American Museum of Natural History, there are 2 skins, a male and a female, purchased from the dealer Rosenberg (that from their appearance were prepared by Arcé), labeled Chiriquí without other data. The white-bellied mountain gem according to Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 159) is found in Costa Rica on the Caribbean slope in the Subtropical Zone of the central mountain area. Slud believed "that almost certainly it continues onward to Panamá." Its status as a bird of the Republic, however, is at present uncertain. Search for it should be made in the high mountains of western Bocas del Toro.

It may be noted that Salvin named this species from specimens collected in Costa Rica by Arcé in 1864, as indicated by the introductory paragraphs (*loc. cit.*, p. 579) of the original description, and verified by skins that I have examined from the Salvin collection in the British Museum. It seems possible that the 2 attributed to "Chiriquí" which have no other data may have been taken at the same time in Costa Rica.

In the original description Salvin listed his material as "*Hab. Costa Rica (Turrialba, Tucurrique.)*" When he compiled the section on hummingbirds for the British Museum catalog (Salvin, Cat. Birds Brit. Mus., vol. 16, 1892, p. 311) under this species he listed 2 males and 2 females from Turrialba, and 1 male from Tucurrique. Rachel Warren (Type-Spec. Birds Brit. Mus., vol. 1, 1966, p. 126) lists "Syntype, Adult male. Reg. no. 1887. 3.22.315. Turrialba, Costa Rica, 1864. Collected by E. Arcé. Salvin-Godman collection. There are two other syntypes in the collection." From this it is appropriate to cite the type locality as Turrialba alone.

**LAMPORNIS CASTANEOVENTRIS (Gould): Variable
Mountain-gem, Colibrí Mudadizo**

Medium size. Green above with white streak behind eye; two color phases in male, one with purple throat, one with white throat; female always cinnamon-rufous on lower surface. (The description that follows is based on the two forms found in Panamá.)

Description.—Length, 105-115 mm. Male, white-throated phase, crown shining emerald-green; rest of upper surface, including lesser to greater wing coverts, rather dark bronze-green, with upper tail coverts more bluish; tail blue-black; wings dusky, with a slight purplish sheen; lores black; edge of wing tawny, cheek feathers basally black, tipped with dark green; a white line above auricular region from back of eye; chin and throat white, viewed at an angle (with strong light from the rear) with a faint pinkish cast; occasionally with a few purple feathers along the base of the gorget, or scattered elsewhere in the white area; sides of neck and breast bright metallic green; lower breast and abdomen gray; glossed with dull bronze-green; under tail coverts bronzy gray, edged with paler gray; tibial tufts white; under wing coverts dull bronze-green.

Male, purple-throated phase, chin and throat shining metallic violet-purple; otherwise, as described for the male with white throat.

Adult female, above shining metallic green, with the upper tail coverts more bluish green; rectrices basally green, with a subterminal band of black, three or more outer pairs tipped with grayish white; side of head, including lores, black, with a white or buff streak above the auricular region; under surface from throat to abdomen tawny-buff; femoral tufts white; under tail coverts light gray centrally, bordered with white, or buff; edge of wing tawny-buff.

The species ranges over the higher elevations in mountain areas from northwestern Nicaragua through Costa Rica and Chiriquí to Veraguas and western Coclé. Females throughout this area in the main are uniform, except that those of Panamá average slightly more rufous on the under surface. Birds of this sex from the eastern end of the range in Panamá also are somewhat darker green above. Difficulty in taxonomic treatment is found in the two distinct styles of throat color of males. In early studies, the female and the two forms of the male were believed to be separate species—a belief that continued for the males after the identity of the females was correctly established. Berlioz (Ornith. als biol. wiss., Festschr. E. Stresemann, 1949, pp. 4-5) more recently has stated the belief that the group as a whole is a complex of a species in which the males are not completely stable. His conclusion was based on examination of about 50 males. After study of more than three times that number found in American museums and in the British Museum I have come to agree with his conclusion. The long series available allows recognition of five groups, separated geographically, in each of which more than 90 percent may be recognized as distinct, and so may be treated as subspecies. The

three found in Costa Rica and Nicaragua are here outlined briefly. The two of Panamá that follow will be given in more detail. All are listed under *castaneiventris*, as the oldest of the species names available.

Lampornis castaneiventris pectoralis Salvin, Ann. Mag. Nat. Hist., ser. 6, vol. 7, no. 4, April, 1891, p. 377. (Northwestern Costa Rica.)

Characters.—Male with throat deeper purple than in any of the other dark-throated populations; otherwise nearest in color to *Lampornis c. homogenes*, but breast with the green restricted, the lower area darker, near hair brown, under tail coverts darker, and green of fore-neck and upper tail coverts decidedly darker.

Female, like *L. c. calolaema*, but crown darker; averaging faintly paler below, especially on the breast.

Measurements.—Males (3 from Nicaragua and Costa Rica), wing 59.3, 59.3 (third specimen molting), tail 32.9-33.7 (33.2), culmen from base 20.5-21.4 (20.8) mm.

Females (4 from Nicaragua), wing 54.0-55.0 (54.4), tail 29.4-31.9 (31.2), culmen from base 20.6-21.7 (21.1) mm.

Mountains of northwestern Costa Rica and Nicaragua.

From the few specimens examined this appears to be a valid form, though information as to its distribution as yet is limited. Salvin in the original description said merely "Adult male. Similar to that of *O. calolaema* in all respects except that the breast, when viewed from in front is nearly black, and not glittering green. The female is probably indistinguishable from that of *O. calolaema*. Hab. Costa Rica." Warren (Type-Spec. Birds Brit. Mus., vol. 1, 1966, p. 222) says of the type "Costa Rica, 1883. Obtained by H. Whitely; prepared by Endrès." The date cited must be that on which the specimen was purchased for the British Museum from the dealer Henry Whitely, who had an agency for natural history material in Wellington Street, Woolwich. E. R. Endrès, a correspondent of Spencer F. Baird, sent three lots of specimens, mainly hummingbirds, to the Smithsonian in 1867, 1868, and 1869. These were flat skins, with no data except the name of the country. A number were sent out in exchange, so that apparently it is one of them that served as Salvin's type. A letter in the Museum accession files relating to the final shipment in 1869 has Endrès' signature (accented as shown here) but no information as to where the birds were collected. Males from western Nicaragua agree with an Endrès specimen in the U. S. National Museum dated 1867 with the locality Costa Rica. It is assumed that the type locality is in the northwestern mountains near Nicaragua. Lawrence (Ann.

Lyc. Nat. Hist. New York, vol. 9, April, 1868) mentions the collection of 1867 as sent to him for study from the Smithsonian, but does not list the present species so that only part of the material may have gone to him.

Lampornis castaneiventris calolaema (Salvin)

Oreopyra calolaema Salvin, Proc. Zool. Soc. London, 1864 (February 1865), p. 584. (Volcán de Irazú, Costa Rica.)

Oreopyra venusta Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 8, 1867, p. 484. (Costa Rica.)

Characters.—Male, throat violet-purple; in general similar to male of *L. c. homogenes* of west-central Panamá, but somewhat lighter gray on breast and abdomen; auricular area blacker.

Female, like *L. c. cinereicauda* in paler color of lower surface, but with central rectrices darker green.

Measurements.—Males (10 specimens), wing 63.1-65.3 (64.4), tail 35.3-37.1 (36.4), culmen from base 20.1-21.5 (20.8) mm.

Females (10 specimens), wing 55.2-58.4 (57.3), tail 32.0-33.1 (32.4, average of 9), culmen from base 21.6-23.0 (22.4) mm.

Mountains of north-central Costa Rica on the volcanoes and higher ridges of the Cordillera Central.

Lampornis castaneiventris cinereicauda (Lawrence)

Oreopyra cinereicauda Lawrence, Ann. Lyc. Nat. Hist., New York, vol. 8, 1867, p. 485. (Costa Rica.)

Characters.—Male, throat white as in typical *castaneiventris*, but breast lighter gray; tail distinctly gray. Rarely an occasional male has the throat like *calolaema*.

Female, agrees with *L. c. calolaema* in paler color of lower surface, and in this differs from *L. c. castaneiventris*; differs from females of the other races in dull bronze-green to grayish bronze-green of central rectrices, and slightly paler color of the adjacent pairs.

Measurements.—Males (10 from the Dota region, Costa Rica), wing 62.9-64.6 (63.9), tail 36.0-38.5 (37.2), culmen from base 20.6-22.5 (21.6) mm.

Females (10 from the Dota region, Costa Rica), wing 56.7-59.6 (58.1), tail 31.4-33.8 (32.5), culmen from base 21.4-24.0 (22.5) mm.

Mountains of southern Costa Rica from the northern end of the Cordillera de Talamanca, including the Dota area, eastward toward Panamá.

Bangs (Proc. Biol. Soc. Washington, vol. 19, July 30, 1906, p. 106) recorded that in "63 males, 33 have the throat violet and white mixed, in some nearly half and half, and 30 have plain white throats." In 25 males in the U. S. National Museum 5 have the throat color a mixture, in the others it is plain white.

The eastern limit of this race may include the higher levels of the mountains in extreme western Bocas del Toro near the Costa Rican boundary, an area where the birds are as yet unknown. The inclusion of *cinereicauda* from the Volcán de Chiriquí in Ridgway (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 507), quoted uncertainly from this source by later authors, was in error. I find no reference in Ridgway's manuscripts, or in the sources that he had available, in verification.

LAMPORNIS CASTANEOVENTRIS CASTANEOVENTRIS
(Gould)

Trochilus (————?) *castaneoventris* Gould, Proc. Zool. Soc. London, pt. 18, 1850 (February 28, 1851), p. 163. (Volcán de Chiriquí, at 1,800 meters, Chiriquí, Panamá.)

Oreopyra leucaspis Gould, Proc. Zool. Soc. London, pt. 28, August 1860, p. 312. (Volcán de Chiriquí, 2,750-3,000 meters, Chiriquí, Panamá.)

Characters.—Male, in normal phase, throat white, rarely with this area violet-purple; tail black to bluish black; breast darker gray than in *cinereicauda*.

Female, darker, more rufous on lower surface than in *calolaema* or *cinereicauda*; central rectrices dark metallic green to slightly bronze-green.

Viewed with a strong light coming from behind, the throat in males shows a light pink reflection. In a number that I have examined there is a faint tinge of violet along the lower edge and at the sides of the gorget, and occasionally a violet feather is found along the side or even farther out among the white feathers. While in the typical white-throated individuals the feathers are white nearly to the base, this may vary to those where the dark base color covers half or slightly more of the feather.

The definite reports known to me of males with purple throats from the Volcán de Chiriquí are few. There is 1 in the U. S. National Museum (no. 273939), marked "Boquete, Chiriquí, 3500 ft." without other data, obtained from a dealer (not named), about 1923. The appearance of the skin indicates preparation by Arcé. Another, not quite so well marked was taken by Dr. Frank Hartman, February 10, 1956, on Cerro Copete above Boquete. In the Mönniche collection

at the Field Museum of Natural History there are 2, 1 from Lérída above Boquete, taken July 1, 1936 (no. 207,000), that has the throat feathers basally white. Another collected at Velo, October 29, 1932, is similar in this marking. A third from Quebrada Velo, March 2, 1933, is interesting as the throat shows only a light tinge of violet, and the white feather bases are extensive. Blake (Fieldiana: Zool., vol. 36, no. 5, 1958, p. 519) listed this as a hybrid between *calolaema* and *castaneoventris*, but I would interpret it as in the variant group. There is 1 purple-throated male in the Museum of Comparative Zoology taken at Boquete, January 19, 1901 (Bangs, Proc. New England Zool. Club, vol. 3, Jan. 30, 1902, p. 30). One in the Salvin-Godman collection in the British Museum was collected by Arcé. Salvadori and Festa (Bol. Mus. Zool. Anat. Comp. R. Univ. Torino, vol. 14, 1899, p. 7) record 1 labeled "Chiriquí" collected by Arcé. Eugene Eisenmann informs that he has seen 1 purple-throated bird near Cerro Punta (on February 29, 1960). In the course of four field expeditions during which I was in the range of this form I did not recognize one among the many typical white-throated individuals seen.

Measurements.—Males (10 from western Chiriquí), wing 64.2-67.0 (65.8), tail 36.0-38.0 (37.0), culmen from base 20.2-22.0 (21.3) mm.

Females (10 from western Chiriquí), wing 56.8-60.6 (58.5), tail 31.6-33.9 (32.9), culmen from base 21.1-23.8 (22.3) mm.

Weight, 4 females, 4.74, 5.23, 5.5, 5.58 grams. (Hartman, Auk, 1954, p. 468.)

Resident. Common in the Subtropical and Temperate Zones on the higher levels of Volcán Barú, from 1,300-3,000 meters; Cerro Pando; Cerro Picacho.

In the lower parts of their range I have found these birds in forest where they fed sometimes at flowers, and sometimes by gleaning among the smaller branches. They range also in open areas on the higher slopes about such flowers as the thistles of the mountain pastures. Once a female chattered at me excitedly as I examined a companion that I had shot. The skin in this species is thick and tough, with firmly attached plumage. In preparation of specimens I was interested to note the heavily muscled bodies, and the size of the leg muscles, appreciably more sturdy than in the green hermit, a bird that in life seemed larger because of its form.

Dr. F. A. Hartman (Condor, 1957, p. 270) recorded a nest (now in the collections of U. S. National Museum) found February 16, 1956, at about 2,000 meters elevation on Cerro Copete above Boquete as placed "in a bush next to a trail overlooking a considerable drop into

a valley. It contained two very small young. The dimensions were: outside diameter 59 mm., outside depth 59; inside diameter 27; inside depth 20. A large amount of moss made up the outside and there were very few lichens on the upper part of one side. The inner body and lining were composed of fine brown plant fibers."

Schönwetter (Handb. Ool., pt. 11, 1966, p. 675) gives the following sizes for 2 eggs from Chiriquí in the British Museum: 13.5×8.9 and 14.5×9.7 mm.

The record for Isla Cébaco (Auk, 1950, p. 364), a locality near sea level, is from a wrongly labeled specimen prepared by J. H. Batty.

LAMPORNIS CASTANEOVENTRIS HOMOGENES Wetmore

Lampornis castaneiventris homogenes Wetmore, Proc. Biol. Soc. Washington, vol. 80, December 1, 1967, p. 235. (Chitra, 1,430 meters elevation, Veraguas, Panamá.)

Characters.—Male, similar to male *Lampornis castaneiventris calolaema*, but breast and abdomen darker gray.

Female, similar to female *Lampornis castaneiventris castaneiventris* but somewhat darker, more bluish green on dorsal surface; central rectrices darker bronze-green; white tipping on outer rectrices less in extent; and bluish black subterminal band broader.

An adult female, taken March 3, 1962, at Alto Carvallo, 900 meters elevation, above the head of Río Guabal, Coclé, had the iris dark brown; cutting edge of mandible at tip dull honey yellow; rest of bill black; scutes on lower end of tarsus and toes dark brown, the scutes bordered with light grayish brown; claws black.

Measurements.—Males (10 from eastern Chiriquí and Veraguas), wing 62.2-65.9 (63.4), tail 33.6-37.6 (35.8), culmen from base 19.6-21.2 (20.5) mm.

Females (11 from eastern Chiriquí, Veraguas, and western Coclé), wing 55.1-57.5 (56.4), tail 31.8-33.3 (32.5), culmen from base 20.8-22.6 (21.5) mm.

Resident. Subtropical Zone in mountains of eastern Chiriquí (Cerro Flores, Cordillera de Tolé), Veraguas (Santa Fé, Chitra), and western Coclé (Alto Carvallo).

This form is known mainly from specimens collected by Arcé near Santa Fé and Chitra, Veraguas, and in the Cordillera de Tolé, Chiriquí, reported mainly by Salvin. Griscom and his companions secured 2 males at about 1,675 meters on Cerro Flores in eastern Chiriquí.

On March 3, 1962, in western Coclé, as I crossed the pass at Alto Carvallo, on returning to El Copé from a camp on the Caribbean slope

at the head of the Río Guabal, a female appeared feeding at flowers in spite of fog and a cold wind. This has been my only personally taken specimen of this race.

In Veraguas and Coclé these hummingbirds appear to range at lower levels than is the case farther west.

HELIODOXA JACULA Gould: Green-crowned Brilliant, Colibrí de Coronilla Verde

Heliodoxa jacula Gould, Proc. Zool. Soc. London, Pt. XVII, 1849 (January-June 1850), p. 96. (Bogotá, Colombia.)

A large species; male deep green, with brilliant green crown, and blue spot on throat; female grayish white below spotted thickly with grass green.

Description.—Length 123-140 mm. Tail long, forked; nostrils completely hidden by feathers. Adult male, crown brilliant shining green; rest of upper surface, including greater, middle, and lesser wing coverts, deep metallic green; tail blue-black, washed more or less with bronze to bronze-green on central pair of rectrices; hindneck and upper tail coverts often washed with bronze; wings slate-black with a violaceous sheen; primary coverts blackish slate with a sheen of dull green; under surface, including under wing coverts metallic green, brilliant on the foreneck and chest, less so elsewhere; a transverse spot of brilliant violet-blue on the upper throat; under tail coverts dull green, edged narrowly with grayish white.

Adult female, upper surface metallic green, including the central rectrices; rest of the tail blue-black, tipped narrowly with white; wings as in male; spot behind the eye and small rictal streak white; spot in front of the eye dusky; sides metallic green; throat and breast white, spotted heavily with metallic green; abdomen similar, but in some without spots; femoral tufts white; under tail coverts dull grayish, washed more or less with green, edged and tipped with grayish white.

Juvenile, (description based on a specimen of *H. j. henryi* in the American Museum of Natural History, collected by Arcé, marked Calobre without other data), chin, sides of neck, and loreal area dull rufous; a wash of brown on forehead; primaries fuscous-brown, duller than in the adult. The brown color appears to be the remainder of a first plumage.

This is a highland species that ranges in mountain areas from Costa Rica and western Panamá to southeastern Colombia. Two of the three geographic races currently recognized are found in Panamá. At present the species is little known except for the specimens that have been collected.

HELIODOXA JACULA HENRYI Lawrence

Heliodoxa Henryi Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 8, December 1866 (1867), p. 402. (Tuís, Costa Rica.)

Tail bluish black in male; a faint wash of dull bronze-green on central pair of rectrices in female.

Measurements.—Males (10 from Panamá), wing 72.7-77.7 (75.5), tail 50.2-54.1 (52.6), culmen from base 23.7-25.7 (24.5) mm.

Females (9 from Panamá), wing 64.8-69.8 (67.2), tail 39.1-43.4 (41.3), culmen from base 24.1-26.7 (25.3) mm.

Weight, 1 female, 7.39 grams. (Hartman, Auk, 1954, p. 468.)

Resident. Found in the Subtropical Zone forests on both Pacific and Caribbean slopes in Chiriquí, Bocas del Toro, and Veraguas; recorded between 1,200 and 2,300 meters.

Records from specimens are as follows—Chiriquí: Santa Clara, El Volcán, Cerro Punta, Boquete, Bajo Mono, Velo, Quiel, Cordillera de Tolé. Bocas del Toro: Caribbean slope on the trail from Boquete; head of the Río Changuena (1,450 meters elevation). Veraguas: Chitra, Calobre, Calovévora.

The published record for "Santiago de Veragua," by Salvin (Proc. Zool. Soc. London, 1867, p. 154), quoted also by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1892, p. 340), certainly is not valid as that locality is in the tropical lowlands. Salvin and Godman also list "Castillo," with a reference to Gould (Ibis, 1869, p. 316) where, however, the locality is not mentioned. Apparently this report was taken from a female specimen (without catalog number) that I have examined in the British Museum, collected by Arcé, with a paper slip marked "Laguna," apparently intended for Laguna del Castillo, one of Arcé's collecting localities. It also has a paper slip that reads "Boquete" in Arcé's writing, while the permanent label reads "Boqueti de Chitra." Obviously, there can be no certainty as to locality in this confusion of data. Also Castillo, while in the foothills, is at too low an elevation for this hummingbird. The locality Chitra, that I have listed, is based on a number of specimens collected by Arcé, now in the British Museum (Natural History). Arcé's specimens marked Calobre, should refer to some area in the mountains above, as the town of that name is located in the foothills.

This form, named by Lawrence "in compliment to Prof. Joseph Henry, the learned Secretary of the Smithsonian Institution," was described from 2 immature specimens from Costa Rica, taken by J. Carmiol. One marked female was collected at Angostura, in the valley of the Río Reventazón, near Turrialba. The second, sexed as

a male, came from Tuís, on a tributary stream in the same general area. As the label is not clearly written Lawrence published this as "Juiz." If the male is taken as type (with the female as co-type) Tuís will be listed as the type locality.

Near Cerro Punta, Chiriquí, on March 23, 1954, I collected a male in dense undergrowth near a small stream, the only one that I have seen. Because of its large size, on first sight it reminded me in its action of a female sabre-wing. In the hand, and during its preparation as a specimen, I was impressed by its strongly muscled form, especially in the legs and wings.

HELIODOXA JACULA JACULA Gould

Characters.—Central rectrices definitely green to bronze-green in male; slightly darker green than the back in female.

Measurements.—Males (10 from Darién and Colombia), wing 72.3-77.6 (74.4), tail 47.1-52.5 (49.8), culmen from base 23.7-26.1 (25.1) mm.

Females (9 from Darién and Colombia), wing 65.1-67.9 (66.8), tail 38.5-43.1 (40.5), culmen from base 24.7-27.2 (25.9) mm.

Resident. Recorded in the forests on Cerro Pirre, where it has been collected between 550 and 1,200 meters, and on the Río Tacarcuna, below Cerro Malí, at 575 meters.

This race is known in Panamá at the upper edge of the Tropical Zone and above in the Subtropical Zone. It ranges widely in the mountains of Colombia.

EUGENES FULGENS SPECTABILIS (Lawrence): Rivoli's Hummingbird, Colibrí de Rivoli

Helimaster spectabilis Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 8, 1867, p. 472. (Costa Rica.)

Eugenes spectabilis chiriquensis Nehrkorn, Orn. Monatsb., vol. 9, September 1901, p. 132. (Chiriquí, Panamá.)

Of large size; with long, straight bill; green above; crown in male violet-blue, in female dusky.

Description.—Length 142-155 mm. Frontal feathers extended well beyond nasal operculum. Adult male, forehead dull black, changing to dark green in reflected light; crown and occiput violet-blue, changing to purple; hindneck and upper back dull black, changing to dark green; cheeks, lower back, rump, upper tail coverts, and greater to

lesser wing coverts dark green; tail dull bronze, tipped very narrowly with grayish white; wings dusky, with a purplish sheen; primary coverts very dark green; outer web of outermost primary edged with buffy white, to produce a very narrow light line for the full length of the feather; lores deep black; a small white spot immediately behind the eye; throat metallic bluish green, with the gray feather bases showing irregularly; breast and sides dark bronze-green, abdomen with this color partly obscured by brownish gray; anal region white; under tail coverts dull bronze-green, edged with light buff.

Adult female, entire crown and occiput dull, dark green, with the feathers tipped narrowly with sooty black; lores and cheeks sooty black; a small white spot behind the eye; rest of upper parts as in male, except that the tail is duller bronze-green, and is tipped prominently with light gray; throat, lower cheeks, and foreneck brownish gray, edged and tipped with dull buff, to form indistinct lines; sides and flanks dark green; breast and abdomen dull brownish gray, washed with dull green.

Bill in both sexes black, with the cutting edge of the mandible dull brownish white.

Measurements.—Males (10 from Chiriquí), wing 74.5-80.5 (77.6), tail 43.5-49.8 (46.7), culmen from base 33.2-37.3 (35.5) mm.

Females (10 from Chiriquí and Costa Rica), wing 69.4-74.2 (72.4), tail 39.7-42.8 (41.1), culmen from base 37.7-41.2 (39.2) mm.

Weight, 1 male, 5.7 grams. (Hartman, Auk, 1954, p. 468.)

Resident. Recorded on the slopes of the great volcano in western Chiriquí, from 1,600 to 2,400 meters elevation; reported only from the Pacific side.

To the present this large hummingbird has been found near Cerro Punta, where I have seen it at 1,750 and 2,200 meters, near Bambito at 1,600 meters, and in the region near Boquete, where it has been recorded at Cerro Copete, Velo, and near the Río Caldera, at 1,600 meters, above the town.

In early March 1955, at 2,200 meters above Bajo Grande, as I followed the old trail that led from Cerro Punta to Boquete, I came to a small, abandoned clearing in a protected hollow. The ground was overgrown with a tangle of weeds over which stood great, yellow-flowered composites 3 to 3½ meters tall. Around these hovered a dozen or more Rivoli's hummingbirds, probing blossom after blossom with their long bills, and then stopping on some little branch to rest. Any intruding companion of their own kind, or one of the other three species of hummers also present, roused them to the usual dashing

chase, so that among them there was constant activity. As they moved about, the small white spot immediately adjacent to the eye was so prominent that it gave the curious impression of being the eye itself. My only observation of this hummer elsewhere was of one in the canyon of the Río Chiriquí Viejo, at 1,750 meters below Cerro Punta.

The population of this species found in Costa Rica and western Chiriquí is definitely different from that from farther north. Related subspecies range through Central America and México to the mountains of southern Arizona and southwestern New Mexico. It is interesting that females in *spectabilis* have somewhat longer bills than males, which is not the case in the populations recognized elsewhere in the species *fulgens*.

Zimmer (Amer. Mus. Nov., no. 1513, 1951, p. 3) combines the genus *Eugenes* and several others with *Heliodoxa*, mainly on the basis of the "long forward extension of the frontal feathering, covering the nasal operculum, and an equal extension of the chin plumage." A superficial similarity in this detail is obvious. But it should be noted that in *Heliodoxa leadbeateri*, type of the genus *Heliodoxa*, the operculum is covered with feathers while in *Eugenes fulgens* it is bare. Until more information is available it seems preferable to retain the two as separate genera.

**HAPLOPHAEDIA AURELIAE (Bourcier and Mulsant): Green
Puff-Leg, Pantalón Bombacho Verde**

Trochilus Aureliae Bourcier and Mulsant, Ann. Sci. Phys. Nat. Agric. Ind., Soc. Roy. Agric., Lyon, vol. 9, 1846, p. 315, pl. 10. (Bogotá, Colombia.)

Medium size; green, with cinnamon upper tail coverts and black bill.

Description.—Length 108-116 mm. With prominent large white and buff feather tufts on the tibia. Adult male, green above, including the outer primary coverts; more or less bronzy on the cheeks and pileum; upper tail coverts cinnamon; tail blue-black; wings dusky with a purplish sheen; foreneck, breast, sides, and under tail coverts metallic green, the feathers tipped narrowly with grayish white; abdomen grayish white; large tibial tufts pure white, mixed more or less with buff; under wing coverts metallic green.

As a species this hummingbird is found in mountain areas from Colombia south through Ecuador and Perú to north Bolivia, with colonies on Cerro Pirre and Cerro Tacarcuna, in eastern Darién. Five races have been recognized in the South American range, with two additional in Panamá. Zimmer (Amer. Mus. Nov. no. 1540, 1951, p. 35) also includes *Haplophaedia lugens* (Gould) as a subspecific en-

tity under *aureliae*. This population, to me, appears specifically distinct.

Dr. Alden Miller (Univ. Cal. Publ. Zool., vol. 66, 1963, pp. 13-14) in the mountains of Cauca, Colombia, described 2 nests of the race *H. a. caucensis* as balls of moss 75 mm. in diameter "hung beneath the arch of large fern fronds which partly protected them from rain . . . The nest cup was a small pocket on top of the free side of the ball." One held the usual 2 eggs.

HAPLOPHAEDIA AURELIAE FLOCCUS (Nelson)

Eriocnemis floccus Nelson, Smithsonian Misc. Coll., vol. 60, no. 3, September 24 (Sept. 27), 1912, p. 8. (Cerro Pirre, Darién, at 1525 meters elevation near the head of Río Limón.)

Eriocnemis floccus Nelson, in Simon, Hist. Nat. Trochilidae, pt. 2, Catalogue, 1921, p. 374, in synonymy of *Haplophaedia aureliae caucensis* (error for *E. floccus*).

Characters.—Male, similar to *Haplophaedia aureliae caucensis* (Simon) of northwestern Colombia, but lighter green below, with the crown greener, less bronze, and the upper tail coverts brighter cinnamon.

Female, distinct from that of *caucensis* in lighter, brighter green on under surface; feathers of foreneck and breast edged and tipped with white, with the green centers correspondingly reduced so that the white is prominent, producing a strongly spotted appearance; above differs as does the male.

Measurements.—Males (3 from Cerro Pirre), wing 60.0-61.0 (60.1), tail 35.3-37.8 (36.6), culmen from base 22.3-23.1 (22.6) mm.

Females (8 from Cerro Pirre), wing 55.0-57.4 (56.2), tail 31.4-35.3 (33.8), culmen from base 21.5-23.5 (22.3) mm.

Resident. Restricted to Cerro Pirre, Darién, where it is common in the Subtropical Zone.

During his work on Cerro Pirre in 1912 Goldman in his notes regarded this "as the most abundant of hummers . . . in fact one of the most abundant birds." He noted particularly that the feather tufts on the legs were conspicuous and easily seen when the bird was perched, even when it was observed in profile. In view of his remarks as to abundance it seems strange that this hummer was not included in collections made by Benson who was at Cana from April to early August 1928, or in those of Oliver Pearson who was on Pirre in March and April, 1938. In addition to the 11 skins in the original

series taken by Goldman I have seen 1 other, in the Gorgas Memorial Laboratory, taken by Dr. Pedro Galindo on August 2, 1965.

Simon (Hist. Nat. Trochilidae, 1921, p. 374) listed Nelson's description of this well-marked form in the synonymy of his race *caucensis*, which he had described from western Colombia, though there is no indication that he had seen a specimen. This action was followed by Griscom, so that the Pirre subspecies until now has had no recognition since its description. The original series is intact in the U. S. National Museum.

HAPLOPHAEDIA AURELIAE GALINDOI Wetmore

Haplophaedia aureliae galindoi Wetmore, Proc. Biol. Soc. Washington, vol. 80, December 1, 1967, p. 232. (Cerro Malí, 1,425 meters elevation, Serranía del Darién, Darién, Panamá.)

Characters.—In general like *Haplophaedia a. floccus*, but darker green above and below; upper tail coverts darker; female with white edgings on feathers of lower surface narrower, less prominent, so that the spotting is heavier.

Measurements.—Males (10 from Cerro Malí and Cerro Tacarcuna), wing 59.9-63.5 (61.5), tail 38.5-40.3 (39.0), culmen from base 20.0-21.7 (20.5) mm.

Females (4 from Cerro Malí and Cerro Tacarcuna), wing 55.7-57.8 (56.8), tail 34.3-35.2 (34.7), culmen from base 20.0-20.8 (20.3) mm.

Resident. Common in the Subtropical Zone on Cerro Malí and Cerro Tacarcuna, Darién, on the latter mountain ranging across the divide from the head of Río Tacarcuna, on the Darién slope to the head of Río Cutí, Chocó, in Colombia.

A male taken on Cerro Malí, February 21, 1964, had the iris dark brown; the portion of the cutting edge of the mandible concealed in the closed bill within the maxilla, dull yellow; rest of bill black; tarsus and toes fuscous; claws black.

A female collected at the same point, on February 20, had the front of the tarsus and the top of the toes dark brown; back of the tarsus and underside of the toes dull buffy white.

An immature male differs from a specimen of *H. a. caucensis* in similar stage, from La Bodega, Antioquia, Colombia, in being definitely blacker on foreneck and breast.

These hummingbirds were forest inhabitants that ranged in the undergrowth, where they fed at small red flowers that were in bloom,

and also gleaned over leaves. The species was the most common of its family over the high mountain slopes. Most of our specimens were taken in mist nets.

The race is named for Dr. Pedro Galindo, of the Gorgas Memorial Laboratory, in recognition of his interest in the avifauna of the Republic.

**HELIOTHRYX BARROTI (Bourcier): Violet-crowned Fairy,
Colibrí de Coronilla Violácea**

FIGURE 44

Trochilus Barroti Bourcier, Rev. Zool., vol. 6, March 1843, p. 72. (Cartagena, Bolívar, Colombia.)

Rather large; with slender form and long tail; white below, metallic green above.

Description.—Length 120-140 mm. Bill broad at base but slender, compressed, and finely pointed distally; feet very small. Adult male, forehead and crown metallic violet; lores and a broad streak below eye black, terminating back of auricular region in a spot of metallic violet; a broad streak from base of mandible along side of neck, and upper surface from side of crown and nape to upper tail coverts, including the inner primary coverts and all of the other wing coverts, emerald-green; four central rectrices blue-black, others white; wings dull black with a faint violet sheen; under surface from chin to under tail coverts pure white; under wing coverts metallic green.

Adult female, in general like male, but with crown green like back; black line on side of head somewhat reduced, and without a violet spot at distal end; no green line on side of neck.

Immature, both sexes, foreneck and breast spotted lightly with gray. An immature female from Almirante, Bocas del Toro, taken February 26, 1956, while of adult size, retains patches of cinnamon-brown feathers on the forecrown and side of the head, that evidently are of a juvenile plumage.

A female, taken at El Real, Darién, January 27, 1964, had the iris dark brown; base of gonys fuscous-brown; rest of bill black; tarsus and toes fuscous; and claws black. Another of the same sex, collected near Puerto Armuelles, Chiriquí, February 17, 1966, had the iris mouse brown.

Measurements.—Males (11 from Panamá), wing 64.3-67.8 (66.9), tail 36.5-51.1 (44.5), culmen from base 19.1-22.1 (20.7) mm.

Females (12 from Honduras, Panamá, and Colombia), wing 64.1-

67.2 (65.4), tail 56.0-67.2 (60.2), culmen from base 19.4-22.0 (20.8) mm.

Weight, 1 female, 5.7 grams. (Hartman, Auk, 1954, p. 468.)

Resident. Fairly common in the Tropical and Subtropical Zones throughout the Republic; to 1,650 meters elevation on Volcán de Chiriquí, above Boquete.

This is a forest species that in the main frequents the high tree crown, though it comes regularly down into the undergrowth to feed at flowers. The pure white under surface, and the white outer feathers in the long tail are marks that catch the eye as the birds move about, particularly when the tail is expanded as they turn in active flight. At times the long, slender form appears almost insectlike as they move swiftly high overhead. They decoy readily to squeaking sounds, but though they may be called down from high perches move so actively that it is difficult to follow them. On one occasion in a Darién forest one of this species was much disturbed by the squealing of a large woodpecker that we were releasing from a mist net so that it came repeatedly to hover about my head.

Skutch (Aud. Mag., 1961, pp. 8-9, 13) reports a nest in Costa Rica located "30 feet above the ground in a small tree standing at the edge of a newly made clearing in the rain-forest. . . . The nest was saddled in the elbow of a nearly horizontal twig with a slight upward bend, in the lowest tier of branches far out from the center of the tree. In shape, the structure was a hollow sphere with the upper third more or less cut away to expose the central cavity. As far as I could see . . . it was composed of downy materials with none of the lichens or green mosses so frequent in hummingbird nests."

It is interesting that in this species females may outnumber males in museum collections, instead of the reverse, true in the majority of the species in the family. It is unusual also that the tail in males is decidedly shorter than in females.

Heliothryx barroti has an extensive range from Tabasco and British Honduras south through Central America, Panamá, and western and northwestern Colombia to the middle Magdalena Valley. Within this area the birds appear to be uniform in color and size. The related *Heliothryx aurita* is found from the Tropical Zone of eastern Colombia, east of the Andes, and from Venezuela south of the Orinoco (with 2 records farther north in Sucre) south to central Bolivia and southern Brazil. In this species the adult male has the crown cap green like the back. Zimmer (Amer. Mus. Nov., no. 1604,

1953, p. 5) has united *aurita* and *barroti* as one species. As the males are always distinct, with no intermediates, I prefer to treat the two as separate specific entities.

De Schauensee has remarked that Cartagena, the type locality cited in the original description for *barroti*, is improbable as that region is not suited to this forest-loving hummingbird. The type specimen was sent to the Paris Museum in 1834 by Adolphe-Ferdinand

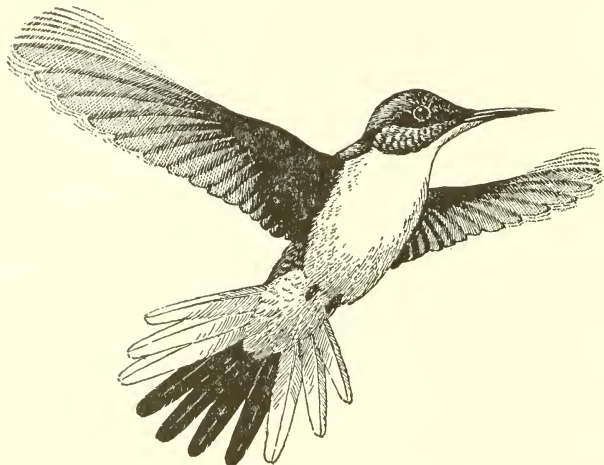


FIGURE 44.—Violet-crowned fairy, colibrí de coronilla violácea, *Heliophryx barroti*.

Barrot, consul general for France, stationed at Cartagena, and was named by Bourcier in his honor. It is this source that led to assignment of the type locality in the original description.

HELIOMASTER LONGIROSTRIS LONGIROSTRIS (Audebert and Vieillot): Long-billed Star-Throat, Garganta-Estrella Piquilarga

Trochilus longirostris Audebert and Vieillot, Ois. Dorés, vol. 1, 1801, p. 128, pl. 59. (Trinidad.)

Heliomaster veraguensis Boucard, Gen. Hummingbirds, 1895, p. 304. ("Veragua.")

Large; with long, nearly straight bill, and prominent, partly iridescent, reddish purple gorget.

Description.—Length 112-125 mm. Feathering on base of bill extended on either side to the bases of the nasal opercula, on throat forward within the mandibular rami to the level of the anterior end of the opercula. Adult male, crown light metallic blue; sides and back of head and hindneck coppery bronze; back, wing coverts, rump, and upper tail coverts bronze-green to bronze; a partly concealed white stripe on rump; central rectrices bronze-green to green; those on either side similar but partly blackish toward ends, except the two outermost, which have a terminal white spot in some specimens; wings dusky with a purplish sheen; streak below eye, and spot behind eye white; chin black; throat metallic reddish purple; lower foreneck, breast and sides brownish gray, glossed with light metallic green; abdomen white; sides with a partly concealed streak of silky, elongated white feathers extending from axillar area to flanks; under tail coverts dusky, tipped with white; under wing coverts dull metallic green.

Adult female, above similar to male, but crown either like back, or partly metallic light blue; black area on chin larger; white streak below eye broader.

Immature, feathers of back and rump tipped narrowly with cinnamon-buff; under surface laterally dark gray tipped lightly with grayish white; gorget black with a faint sheen of purple.

Bill, tarsi, feet, and claws black.

Measurements.—Males (7 from Panamá and Colombia), wing 59.0-62.0 (59.3), tail 30.3-33.7 (32.1), culmen from base 34.0-38.3 (35.3) mm.

Females (9 from Panamá and Colombia), wing 58.3-59.9 (59.2), tail 29.4-31.6 (30.4), culmen from base 33.3-36.7 (35.1) mm.

Resident. Widely distributed on the Pacific slope, mainly in the lowlands, but to 1,200 meters in western Chiriquí (Santa Clara), 900 meters near Boquete, and 550 meters on Cerro Pirre. On the Caribbean side recorded from near the town of Bocas del Toro, on the lower Río Chagres near Juan Mina, Canal Zone, and near Puerto Obaldía, San Blas; Isla Taboga.

These are birds of groves, borders of pastures, lines of trees along streams in the savannas, and low second growth, that in general do not range in heavily forested areas. They are only fairly common, often seen feeding at flowers in the tree tops, and regularly hawking for gnats in bands of these insects that circle fairly high in air. Occasionally one has scolded me with low notes, especially when I have called small birds with squeaking sounds. As this species

frequents open areas it ranges mainly on the Pacific slope. On the Caribbean side Peters (Bull. Mus. Comp. Zool., vol. 71, 1931, p. 316) reported 1 taken by Benson at Bocas del Toro. Dr. Frank A. Hartman secured a male at Juan Mina, January 5, 1956. And Griscom (Bull. Mus. Comp. Zool., vol. 72, 1932, p. 332) received a female from von Wedel taken at Puerto Obaldía, San Blas. It has been seen near the laboratory on Barro Colorado Island, and Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 7, 1861, p. 291) lists it as sent to him by McLeannan, probably from near Lion Hill.

Ridgway's record (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 347) for "Saboga Island" must be based on 2 specimens in our collection obtained by Heyde and Lux in September 1888, on Isla Taboga. I believe that a large hummingbird of the proper size, with dark throat, that I saw for an instant only near the road below the summit of Taboga on February 3, 1952, was this species.

Goldman, in his field notes, recorded that one shot among flowers in the top of a tall *Erythrina* had the throat "filled with small insects." In the stomach of 1 that he collected at Boca de Cupe, Darién, June 14, 1912, I found 2 immature mites, and fragments of small spiders.

Rowley (Proc. West. Found. Vert. Zool., vol. 1, 1966, p. 152) described 2 nests of *Heliomaster longirostris* (presumably of the race *pallidiceps*) found near San Gabriel Mixtepec, Oaxaca, México, one placed high above the ground in a *Cecropia*, the other in a shrub in a coffee finca. Both nests were cup-shaped, the second one, which contained 2 white eggs, being approximately 37.5 mm. high by 48.6 mm. broad, with the cup 31.3 mm. deep. The eggs measured 12.8×8.8 and 13.6×8.5 mm.

In listing this species in the genus *Heliomaster* instead of in *Anthoscenus* Richmond I have accepted current treatment, but with some reservations since *longirostris* differs decidedly from *Heliomaster furcifer* (Shaw), the type of the genus. This latter species has elongated, narrowed rectrices and a deeply forked tail, and differs also in the feathering on the nasal operculum and the throat. Peters considered that *Heliomaster squamosus* (Temminck) bridges the differences, but this may merit further study. Validity of a race *stuartae*, described from northern Colombia, that has been listed from eastern Panamá, is not demonstrated in the extensive series of specimens that I have seen.

The species *heliomaster* was described from a specimen secured by Parkinson "à Londres dans la collection de M. Thompson," with no locality indicated other than "Indes Occidentales." Vieillot later

(Nouv. Dict. Hist. Nat., nouv. éd., 1817, p. 377) stated that it was found on Trinidad. Berlepsch and Hartert (Nov. Zool., vol. 9, 1902, p. 88) in discussing this species apparently were not aware of Vieillot's statement on the locality, as in a footnote to the original reference they wrote "We supplement Trinidad."

**PHILODICE BRYANTAE (Lawrence): Costa Rican Wood-star,
Estrella Montañesa costarricense**

Doricha bryantae Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 8, 1867, p. 483. (Santa María de Dota, Province of San José, Costa Rica.)

Small; male with elongated, narrowed tail, and reddish purple gorget; shaft of outer primary thickened. Female with cinnamon sides and tail tip; crown darker than back.

Description.—Length 78-88 mm. Adult male, crown to upper tail coverts dull metallic bronze-green; central pair of rectrices short and broad, about twice as long as upper tail coverts, in color dull metallic green appearing black at tips; next pair half the length of outer pairs, narrowed at the tips, also dull metallic green; outer pairs long and narrow, with cinnamon-colored shafts and cinnamon-buff borders on the inner web; wings, including primary wing coverts, dusky with a purplish sheen; rest of wing coverts like back; a white spot behind the eye; lores black, bordered with cinnamon toward the bill; throat and upper foreneck glittering reddish purple, bordered below on upper breast with white; lower breast and sides brownish gray glossed with bronze-green; flanks cinnamon-rufous; abdomen and lateral tufts white; tufts on side of rump white to cinnamon; under wing coverts dull green; edge of wing rufous; under tail coverts bronze-green, bordered with cinnamon.

Adult female, above bronzy metallic green, darker on the crown; central pair of rectrices short, about three-fourths as long as the others, dark metallic green; others short, cinnamon-rufous basally, tipped with cinnamon-buff, with a broad subterminal band of black; lores and spot behind the eye as in male; foreneck, breast, and abdomen cinnamon-buff to white; sides, flanks, and under tail coverts cinnamon-rufous; sides of breast glossed with dull green; tufts on either side of abdomen white.

Young male like female.

Measurements.—Males (10 from Panamá), wing 41.0-43.5 (42.2), tail 31.6-35.6 (33.4), culmen from base 15.5-17.7 (16.6) mm.

Females (10 from Panamá and Costa Rica), wing 41.3-43.7 (42.5), tail 21.0-23.3 (21.9), culmen from base 16.1-18.3 (17.2) mm.

Resident. Fairly common in the mountains of Chiriquí and Veraguas, in the Subtropical and upper Tropical Zones; recorded to date only from the Pacific slope.

In western Chiriquí I found this species on the lower slopes of Cerro Pando beyond El Volcán, at 1,350 meters, where on March 8, 1954, 2 fed quietly at the flowers of a low shrub under cover of the forest. Occasionally the 2, both immature males, searched the same spike of blossoms, usually amicably. Once or twice they turned toward one another in threat, moving up and down for a meter or less, but made no other demonstration. Others were seen here searching flowers on the forested slopes to elevations of 1,600 meters. The following year at Santa Clara I found 2 juveniles at 1,150 meters in an open pasture beside the brush-grown banks of the Quebrada Santa Clara, where they rested in the sun on dead branches in a small tree. Elsewhere, they have been taken at Quiel, and at other localities in the Boquete region, to 1,750 meters elevation.

In the mountains of Veraguas, Arcé found them more common and forwarded series of specimens to Salvin from Castillo and the Cordillera del Chucú. A male in our collections was taken by Heyde and Lux at Chitra in July 1888.

In small size this species suggests the still more tiny *Selasphorus* of the same mountain area, but in action usually *Philodice bryantae* is more active in movement.

Lawrence named this beautiful species "in compliment to Mrs. Bryant, the widow of my friend, the late Dr. Henry Bryant, of Boston."

**ARCHILOCHUS COLUBRIS (Linnaeus): Ruby-throated
Hummingbird, Colibrí Garganta de Fuego**

Trochilus Colubris Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 120. (South Carolina.)

Small; dull green above, grayish white below with white-tipped tail, in immature plumage, the stage usual in those that visit the Republic. Rarely an adult male with brilliant red gorget is seen.

Description.—Length 75-90 mm; six innermost primaries much narrower than others. Adult male, end of tail notched, with rectrices narrowed at tip; upper surface metallic bronze-green; tail purple-black; wings dusky with a faint purplish sheen; primary coverts dusky, glossed faintly with bronze-green; other wing coverts like back; edge of wing buffy white; a small white spot behind the eye;

chin and side of head dull black; gorget metallic red, bordered below by a band of white across lower foreneck and upper breast; rest of breast gray; center of abdomen white; under tail coverts white, tipped with gray; sides dull iridescent green; a white spot on either side of rump.

Adult female, and immature, above metallic bronze-green; central rectrices like back; others dull black, the two or three outermost tipped with white; wings dull grayish brown to dusky, faintly glossed with purple; edge of wing grayish white; a small white spot behind eye; side of head dull gray; lores dusky; under surface grayish white; tibial tufts and one on either side of rump white; flanks more or less brownish buff.

Immature male, with throat finely spotted with dusky.

Measurements.—(From Ridgway, U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 629) males, wing 37.0-40.0 (38.5), tail 25.5-28.5 (27.0), exposed culmen 15.0-17.0 (15.9) mm.

Females, wing 43.5-45.5 (44.5), tail 25.0-26.5 (25.6), exposed culmen 17.0-19.5 (18.2) mm.

Weight, 2 males, 3.0, 3.4 grams; 3 females 3.05, 3.4, 3.63 grams (Hartman, Auk, 1954, p. 468.)

Migrant from the north. Apparently uncommon; recorded on the Pacific slope in western Panamá.

The ruby-throated hummingbird of eastern North America comes regularly south to western Costa Rica, but there are few records for Panamá. Salvin (Proc. Zool. Soc. London, 1870, p. 208) received an adult male, and 3 females from Arcé, taken on the southern slope of the volcano in western Chiriquí. The male now is in the British Museum, and 1 of the females is in the U. S. National Museum. The others seem to have disappeared.

Dr. Eugene Eisenmann informs me that on November 25, 1962, he saw 4 or 5 at Playa Coronado, in the western sector of the Province of Panamá, among them an adult male, and an immature bird of the same sex with some iridescent feathers appearing on the throat. These are the only records available.

In late October and early November 1940, I found these hummingbirds common near Liberia, Guanacaste, in northwestern Costa Rica. Here they fed at flowers in an area where thickets and woodland alternated with pastures. It is probable that those that reach Panamá may range in similar territory, where they may be expected from late October to April.

ACESTRURA HELIODOR HELIODOR (Bourcier): Gorgeted Woodstar, Estrella Montañesa Gorguera

Ornismya heliodor Bourcier, Rev. Zool., vol. 3, September 1840, p. 275. (Bogotá, Colombia.)

Very small; male with the reddish purple gorget elongated in a point on either side of the neck; female like that sex in the Costa Rican woodstar, but definitely smaller throughout, brighter bronze-green above, and with crown like back.

Description.—Length 68-75 mm. Male, with rectrices very narrow, somewhat elongated and pointed, the outermost shorter, more slender, and with thickened shaft; female, with rectrices longer and of normal form. Adult male, above dark shining green, including cheeks and wing coverts, except primary coverts, which are partly black; central pair of rectrices, one-half length of those adjacent, slightly shorter than outermost pair; entire tail black with a purple sheen; wings, including anterior edge, dusky with a faint purplish sheen; a small white spot behind the eye; lores black; gorget reddish purple, with lower margin square cut on center of foreneck, much elongated on the side of the neck, with the terminal feathers narrowed and pointed, bordered below by a narrow band of white; lower foreneck and upper breast dark gray; a spot on either side of rump and tibial tufts white; rest of under surface, including under tail coverts, and under wing coverts, dark iridescent bluish green.

Adult female, above bright iridescent bronze-green; broad central rectrices, shorter than others, like back; next pair somewhat longer, iridescent green basally, with rufous shaft and dull black tip; outer pairs cinnamon-rufous, with a wide subterminal band of black; a small white spot behind eye, and a slight indication of white in the auriculars; entire under surface, including rectal area, light cinnamon-buff to white, usually whiter on breast, darker on sides and under tail coverts; white tufts beside the rump and on the tibia as in male.

Immature male, in color like female.

Bill, feet, and claws black.

Measurements.—Males (10 from Colombia), wing 28.0-29.7 (29.0), tail 18.2-20.8 (19.7), culmen from base 13.0-15.3 (14.6) mm.

Females (10 from Colombia), wing 33.3-38.9 (35.8), tail 15.0-17.2 (15.7), culmen from base 14.3-16.5 (15.4) mm.

The difference in wing length, with the female decidedly the larger, is unusual. Four immature males resemble adult females in having shorter tails than adult males. Their wing measurements, ranging

from 31.0-33.6 mm., are intermediate between those of adults of the two sexes.

Known in Panamá from 1 specimen from Cerro Pirre, Darién, collected at Cana April 13, 1938, by Oliver Pearson. This skin, in the Academy of Natural Sciences in Philadelphia, is immature. It is whiter on the throat, foreneck, and upper breast than usual in this species. The measurements are as follows; wing 37.6, tail 19.0, culmen from base 15.2 mm. It is marked as male, which if accurate may indicate that it represents a local race, as the wing is longer than in immature males of typical *A. h. heliodor* from Colombia of similar stage of plumage.

SELASPHORUS FLAMMULA TORRIDUS Salvin: Volcano
Hummingbird, Colibrí Volcanejo

Selasphorus torridus Salvin, Proc. Zool. Soc. London, 1870, p. 208. (Volcán de Chiriquí, Panamá.)

Very small; male, throat metallic grayish purple to grayish green; female, central tail feathers partly dark shining green, partly black.

Description.—Length 76-85 mm. Adult male, upper surface metallic bronze-green, darker on the crown; central pair of rectrices with outer web bronze-green like back; inner web dusky, edged with cinnamon toward base; other tail feathers dusky to black, bordered more or less with cinnamon; wings, including primary coverts, dull black, with a faint purplish sheen; lores, and feathers at anterior end of eye, dark rufous; chin rufous; gorget (with pointed ends extended along side of neck) metallic grayish purple to dark grayish green; the feathers basally buff to cinnamon, with a narrow dusky bar adjacent to the outer metallic area; lower foreneck, breast, and abdomen white; under tail coverts centrally buff, edged broadly with white; axillars, sides, and flanks cinnamon-buff, mixed with dark gray; under wing coverts dull metallic green.

Adult female, above like male, except that both webs of the middle rectrices are bronze-green; other rectrices basally cinnamon-rufous, with a broad subterminal band of black, and white tip; loreal area black, bordered above by cinnamon-rufous; under surface white, with foreneck spotted with dusky to dull greenish gray; sides and flanks cinnamon-buff; under tail coverts like male; axillars in some dusky, in others partly cinnamon-buff.

Immature male, in general like female.

An immature male taken March 8, 1965, at 1,900 meters on the west slope of Volcán Barú, had the iris dark brown; cutting edge

of base of mandible fuscous; rest of bill black; tarsus and toes fuscous-black; claws black.

Measurements.—Males (10 from Volcán de Chiriquí), wing 41.0-42.8 (41.6), tail 26.7-29.1 (27.5), culmen from base 12.2-13.8 (12.9) mm.

Females (10 from Volcán de Chiriquí), wing 40.8-44.8 (42.5), tail 25.1-27.2 (26.1), culmen from base 13.0-15.2 (14.1 average of 9) mm.

Resident. Fairly common in the upper Subtropical and Temperate Zones on Volcán Barú, Chiriquí, where it ranges from 1,700 to 3,100 meters.

I have found them regularly on the western side of the volcano back of Cerro Punta, and lower down on the slopes above the lava flows near the trail leading to the summit of the mountain. Above Boquete they have been recorded from near the Finca Lérida to Cerro Copete, and on the higher slopes toward the summit.

They feed at flowers, found low down in forest, or scattered over the more open slopes. In the lower levels I have encountered them in company with the smaller scintillant hummingbird, at the tall, flowering spikes of yuccas. Like the smaller species they may rest on open perches for the warmth of the sun in spots protected from mountain winds. At large blossoms they often cling to the plant stem as they probe the corollas. The dull-colored gorget may appear almost black when the birds are distant. Like their smaller companions when feeding they move slowly from flower to flower. I am indebted to Dr. Eugene Eisenmann for a record of the nest of this interesting bird that he found October 1, 1965, at about 2,100 meters elevation above Cerro Punta on the trail known as Camino á Boquete. According to Dr. Eisenmann's notes "the nest was a downy cup ornamented with some lichens, in a bush at the edge of a hillside pasture" somewhat less than 2 meters above the ground. The female was flushed from the nest, but there were no eggs.

On Volcán de Chiriquí all males of this group of hummingbirds, from the specimens seen or recorded, have dull-colored gorgets, varying from grayish green to grayish purple. These birds have been described as a distinct species *torridus*. In typical *flammula* of Costa Rica this marking is reddish purple. Occasionally one of that northern population has the gorget colored as in the *torridus* style, but this modification seems rare and unusual. In the American Museum of Natural History there are 4 of this style from Volcán Irazú among 22 of the normal color. I find 1 among 23 males of *flammula* in the

U. S. National Museum, and there is 1 in the Museum of Zoology, University of Michigan, (loaned to me for examination by Dr. Robert W. Storer) collected by Paul Slud March 6, 1952, near the crater of Volcán Turrialba. Carriker (Ann. Carnegie Mus., vol. 6, 1910, p. 546) described an immature male from the Dota area in the Bangs collection that is of the *torridus* color, and lists another from Irazú.

In the early history of the species there was confusion in the application of the names *flammula* and *torridus*, both proposed by Salvin. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1892, pp. 354-355, pl. 56, fig. 2) cite references to literature for *torridus* from Costa Rica, but these seem to apply to typical *flammula*. They say definitely that all specimens of *torridus* seen "were sent to us by our collector Arcé from the Volcán de Chiriquí." When Ridgway's references (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 604) are checked only 2 records of the *torridus* form from Costa Rica prove valid, 1 from Irazú and 1 from the Dota Mountains. While Berlioz (Orn. Biol. Wiss. Festschr. Stresemann, 1949, pp. 5-6) unites the birds of Costa Rica and Panamá under a single name, careful reading of his discussion indicates that he had seen the *torridus* style of coloration only from Chiriquí, his information on Costa Rica coming from literature, apparently mainly from Carriker. The question of relationship in the two groups is one that requires more information than is now available. It seems appropriate in this circumstance to list the Panamanian population as a geographic race separate from that of Costa Rica.

SELASPHORUS ARDENS Salvin: Glow-throated Hummingbird,
Colibrí Garganta Ardiente

Selasphorus ardens Salvin, Proc. Zool. Soc. London, 1870, p. 209. (Castillo, Veraguas, Panamá.)

Very small, somewhat less than *S. f. torridus*; gorget in male brilliant purplish red; central rectrices with a black shaft stripe, with green restricted or absent.

Description.—Length 67-72 mm. Adult male, upper surface metallic bronze-green; central rectrices dull black, edged broadly with cinnamon-rufous; others cinnamon-rufous laterally with dull black centers; wings dusky with a purplish sheen; side of head and chin cinnamon-rufous; throat bright purplish red; breast white washed with buff; abdomen grayish white; under tail coverts light to deep buff; sides bronze-green with a wash of dull rufous; femoral and lateral tufts buffy white.

Adult female, upper surface metallic bronze-green, duller on the crown, and cinnamon-rufous on the rump; tail cinnamon-rufous, banded with dull black; side of head cinnamon-rufous, with the auricular region dusky; throat buff to cinnamon-buff, dotted with dusky; breast buffy white, rest of under surface buff to pale cinnamon-buff; femoral and lateral tufts buffy white.

Measurements.—Males (8 from eastern Chiriquí and Veraguas), wing 39.3-40.8 (40.0), tail 26.1-28.5 (27.2) culmen from base 12.6-13.3 (12.9, average of 7) mm.

Females (3 from eastern Chiriquí and Veraguas), wing 39.1-40.7 (39.8), tail 23.4-24.1 (23.7), culmen from base 12.5-14.0 (13.4) mm.

Resident. Mountains of eastern Chiriquí (Cerro Flores) and Veraguas.

Little is known of this interesting species. It was described by Salvin from 2 specimens, the male labeled Castillo, which, therefore, is the type locality. The second skin, from Calovévora, does not have the sex marked but is an immature male, as stated by Salvin, and as is shown by a few spots of the reddish purple of the adult on the throat and upper foreneck. I have examined these 2 specimens and also a female, all collected by Arcé, in the British Museum. The American Museum of Natural History has 4 males and a female (3 taken by Arcé) but partly with incomplete data. One of the males, without a catalog number and 1 female are labeled "Costa Rica," and another male is marked "Chiriquí," all unquestionably incorrect. In view of the known range it is believed that all 3 are from Veraguas. Another male marked "Veragua" is assumed to be from the same place. In the Field Museum collection there is 1 male, also labeled "Veragua" on the original label, but marked "Chiriquí" on another that bears the name of the dealer Boucard. These specimens all appear to be from the period prior to 1870 when Arcé was collecting in the mountains near Santa Fé, Calovévora, and Castillo. Strangely enough no one has secured the species in that area since. The only recent record is of 2 males and a female, taken on Cerro Flores in eastern Chiriquí by Ludlow Griscom and his party from March 9 to 12, 1924.

Ridgway (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 605) had available only 2 males and a female from the American Museum. He was not certain at the time that the female might not be that of *S. scintilla*. Material that I have seen, including this specimen, verifies its identity as *ardens*.

From the little known it is probable that the zonal range is similar to that of *Selasphorus scintilla*.

**SELASPHORUS SCINTILLA (Gould): Scintillant Hummingbird,
Colibrí Centelleante**

Trochilus (Selasphorus) scintilla Gould, Proc. Zool. Soc. London, 1850 (February 28, 1851), p. 162. (Volcán de Chiriquí, altitude 2750 meters, Chiriquí, Panamá.)

Very small; male, throat brilliant, shining red; female, central tail feathers mainly rufous brown.

Description.—Length 67-77 mm. Adult male, crown to rump, including lesser to greater wing coverts, bronze-green; upper tail coverts centrally like rump, edged with cinnamon-rufous; rectrices cinnamon-rufous, with a shaft line of dull black; wings, including primary coverts, dusky, with a rufescent sheen; lores, side of head and point of chin cinnamon-rufous; gorget, covering throat with elongated points along the neck on either side, brilliant orange-red; lower foreneck, upper breast, and center of abdomen white; rest of under surface cinnamon to buff, with sides spotted with metallic green; under tail coverts cinnamon-rufous, edged with buff; under wing coverts metallic green; axillars cinnamon-rufous.

Adult female, duller green than male on upper surface; tail with basal part cinnamon-rufous; central rectrices with a distal line of metallic green, all with a subterminal band of black, and tip of cinnamon-rufous; a dusky spot around eye; lores and line over eye cinnamon-rufous; under surface white to deep buff, with the sides cinnamon-rufous; throat and foreneck spotted or streaked with dusky to dull green.

Immature, like adult female, but in juvenile stage feathers of upper surface margined with rusty.

A male, taken March 8, 1965, at El Volcán, Chiriquí, had the iris dark brown; bill black, becoming fuscous on the base of the mandibular rami; tarsus and toes fuscous-black; claws black.

A female, collected March 1, 1965, at the same point, was similar except that the bill was wholly black.

Measurements.—Males (10 from Chiriquí), wing 32.4-35.5 (33.8), tail 22.4-24.8 (23.6), culmen from base 11.5-12.9 (12.2) mm.

Females (10 from Chiriquí), wing 36.2-38.8 (36.8), tail 21.7-23.6 (22.6), culmen from base 13.0-15.1 (13.5) mm.

Weight: 9 females 2.23 ± 0.07 grams; 3 males 2.1, 2.15, 2.75 grams. (Hartman, Auk, 1954, p. 468).

Resident. Common in the Subtropical Zone on the Pacific slope of the great volcano of western Chiriquí from 1,250 to 1,900 meters, ranging in lesser number to 2,500 and 3,000 meters; Cerro Pando.

On the western side of Volcán Barú this species ranges over Cerro Pando, and above Cerro Punta; on the east it is common from

Boquete to Quiel and Cerro Copete. The inclusion of Veraguas in the range given by Griscom (Bull. Mus. Comp. Zool., vol. 78, 1935, p. 324) was in error. Published records (Auk, 1950, p. 364) for the low islands of Cébaco and Gobernadora off the Pacific coast are based on specimens wrongly labeled, forwarded by J. H. Batty to the Rothschild collection.

These attractive little birds of the mountain slopes range from the low brush of the high valleys to heavy forests wherever there are flowers. While in travel they move with the flashing speed usual in the smaller hummingbirds, when feeding their movements often are slow and almost mothlike. Regularly they perch beside the blossoms as they probe them, action that I have observed especially at the flowering spikes of the tall agaves on the slopes of the old lava flows on the western base of Barú. When they stop to rest on some open perch they appear so tiny that often it is difficult to make them out, even near at hand, except as they twitch wings and tail or wipe the bill. In the light of the early morning sun as the birds fly low there is often a tiny pinpoint of brilliant sheen from the throat that is most attractive.

Blake (Condor, 1956, pp. 386-387) described 3 nests in the T. B. Mönniche collection, taken November 4, and December 12, 1932, near the Finca Lérica, above Boquete, as "compact, cup-shaped structures of moss, more or less covered with lichens; . . . bowls lined with white, cottony plant fibres, brown scales from a fern stem, and feathers from an undetermined passerine bird. Average dimensions of the nests are $1\frac{1}{2} \times 1\frac{1}{4}$ inches. The cups measure approximately $\frac{7}{8} \times \frac{5}{8}$ inches. Each nest contained two dull white eggs. Measurements of two clutches, 12×8 and 11.5×8 ; 11.5×8 and 11×8 mm."

A nest collected by F. A. Hartman, found at 2,100 meters on Cerro Copete, February 10, 1956, was described (Condor, 1957, p. 270) as placed in a bush a meter and a half tall standing on a knoll surrounded by other bushes and trees. "The dimensions were: outside diameter, 43 mm.; outside depth, 55; inside diameter, 18; inside depth, 15 to 18. The nest was composed of fine downy white fibers which also served as a lining. The outside was plastered with lichens and some moss. One fresh egg was found in the nest." This nest, now in the U. S. National Museum, is saddled on a twig, and is supported on one side by being woven against a small upright shrub stem. The upper margin, surrounding the rim of the open cup is decorated with a border of fine, paper-thin light brown shreds of plant fiber.

Order TROGONIFORMES

Family TROGONIDAE: Trogons, Trogónidos

This family of colorful species has its greatest abundance in Central and South America where 21 of its 36 living kinds are found. India and southeastern Asia, including the Philippines, Java, Borneo, and Sumatra, share 11, and 3 others range widely in Africa south of the Sahara region. The family has no close relatives, and is ancient in its history as fossil forms are known from early Tertiary time.

The 11 species recorded in Panamá are distributed throughout forest areas from the lowlands to high in the mountains. The quetzal, found from Chiapas to western Panamá, is the most spectacular of the group, as in the male the elongated upper tail coverts may be nearly a meter in length. The feather covering in these birds is dense and compact, but so loosely attached to the thin, delicate skin that individual plumes fall out at the slightest touch in handling, though the birds themselves fly and move without such damage. The four-toed foot in this family differs from that of other living birds in having the inner toe turned back parallel to the hind toe. In other yoke-toed birds, with two toes pointed forward and two to the rear, the reversed digit is always the outer one.

Several of the American species, widely spread through the tropical lowlands, have sonorous notes repeated rapidly in rattling sequence that are among the attractive sounds of tropical jungles, but often ventriloquial so that it is difficult to judge the distance or the direction from which they come.

All of the species are arboreal forest inhabitants and of quiet habit, as they rest motionless, often concealed among leaves, for long periods. Their food in part is fruits and drupes of forest trees which they fly out to seize on the wing. Insects, often of considerable size, are secured in the same manner. The nest is in natural cavities, or in holes dug in decaying tree trunks, in arboreal termite nests, or in the large paperlike nests of wasps.

While a number of names are applied to them, as a whole, in Spanish-speaking countries, they are often known collectively as *Palomas de la Virgen*.

KEY TO SPECIES OF TROGONIDAE

1. Cutting edges of bill smooth, except for a terminal notch on maxilla and mandible; middle wing coverts elongated, (genus *Pharomachrus*).... 2
- Cutting edges of bill serrated; middle wing coverts of normal length... 5

2. Breast and abdomen red (males)..... 3
Breast gray or brown, only the abdomen red (females)..... 4
3. Upper tail coverts greatly elongated, twice or more the length of tail;
outer rectrices white.
Quetzal, *Pharomachrus mocinno costaricensis*, male, p. 381
Upper tail coverts equal in length to tail, or slightly longer; outer rectrices
black, in some a white spot at tip.
Golden-headed quetzal, *Pharomachrus pavoninus auriceps*, male, p. 386
4. Breast and sides slightly brownish gray; outer rectrices barred broadly
with white; crown green, like back.
Quetzal, *Pharomachrus mocinno costaricensis*, female, p. 381
Breast and sides brown; outer rectrices only lightly tipped with white;
crown golden brown.
Golden-headed quetzal, *Pharomachrus pavoninus auriceps*, female, p. 386
5. Breast and abdomen distinctly red (in one species orange-red)..... 6
Breast and abdomen yellow to orange..... 15
6. Larger, wing more than 140 mm., culmen more than 21.0 mm..... 7
Smaller, wing less than 130 mm., culmen less than 19.0 mm.; a broad white
band on the breast in both sexes..... 14
7. Three outermost rectrices pure white for one-third or more of distal end.
Baird's trogon, *Trogon bairdii*, male, p. 397
Outer rectrices not broadly tipped with white..... 8
8. Outer pairs of rectrices barred very narrowly with white..... 9
Outer rectrices without markings, or with whitish tips and indistinct barring
and mottling on outer web only..... 11
9. Back and neck green, rest of lower surface bright red.
Lattice-tailed trogon, *Trogon clathratus*, male, p. 395
Back, foreneck, and upper breast slate-gray, posterior under surface pale
red or orange-red..... 10
10. Center of breast and sides brown; wing coverts finely mottled with gray,
tail with very narrow white crossbars.
Lattice-tailed trogon, *Trogon clathratus*, female, p. 395
Breast and sides wholly dark gray; secondaries and wing coverts narrowly
barred with white; outer tail feathers strongly barred with white.
Baird's trogon, *Trogon bairdii*, female, p. 397
11. Upper surface metallic green (adult males)..... 12
Upper surface slate-gray (adult females)..... 13
12. A narrow white band across breast (in some individuals partly concealed).
Long-tailed trogon, *Trogon melanurus macroura*, male, p. 393
Without a white breast band.
Masséna trogon, *Trogon massena hoffmanni*, male, p. 388
13. Lighter gray, especially on breast and head; tail slightly longer than wing;
bill smaller, narrower.
Long-tailed trogon, *Trogon melanurus macroura*, female, p. 393
Darker gray, especially on breast and head; tail slightly shorter than wing;
bill larger, broader.
Masséna trogon, *Trogon massena hoffmanni*, female, p. 388
14. Back, breast and central tail feathers green.
Collared trogon, *Trogon collaris*, male, p. 404

Back, breast and central tail feathers brown.

Collared trogon, *Trogon collaris*, female, p. 404

15. Crown and hindneck black, dark blue, or slate-gray..... 16

Crown and hindneck metallic green or brown..... 17

16. Smaller, wing less than 120 mm., culmen less than 19 mm.

Gartered trogon, *Trogon violaceus concinnus* male and female, p. 415

Larger, wing more than 130 mm., culmen more than 21 mm.

White-tailed trogon, *Trogon viridis chionurus*, male and female, p. 400

17. Crown, hindneck and upper breast green, males..... 18

Crown, hindneck and breast brown, females..... 19

18. A distinct white band across breast; lower breast and abdomen orange; edge of eyelids (in life) black; white bands and tip on tail narrow.

Orange-bellied trogon, *Trogon a. aurantiiventris*, male, p. 409

White breast band not clearly evident; lower breast and abdomen yellow; edge of eyelids (in life) light blue; white bands and tip on tail broad.

Graceful trogon, *Trogon rufus tenellus*, male, p. 412

19. Outer webs of outer rectrices white, finely mottled with dusky, edge of eyelids (in life) black.

Orange-bellied trogon, *Trogon a. aurantiiventris*, female, p. 409

Outer webs of outer rectrices white, banded with black, edge of eyelids (in life) light blue. Graceful trogon, *Trogon rufus tenellus*, female, p. 412

PHAROMACHRUS MOCINNO COSTARICENSIS Cabanis:

Quetzal

FIGURE 45

Pharomachrus costaricensis Cabanis, Journ. f. Orn., vol. 17, September 1869, p. 313. (Costa Rica.)

Large; male with a narrow, compressed crest, and greatly elongated, narrowed, upper tail coverts that may be twice the length of the tail. Female with bushy crest, and upper tail coverts long, but extended little, if at all, beyond the tail.

Description.—Length (from anterior end of bill to end of tail), exclusive of elongated upper tail coverts, 330-370 mm.; cutting edge of bill smooth except for a subterminal notch; nostril elongated, narrow; middle wing coverts long and curved, completely concealing the greater coverts. Adult male, with feathers of side of head long, appressed, projecting forward to cover most of bill, and extending vertically to meet those of the opposite side in a laterally compressed crest. Upper surface, including all of head, lesser and middle wing coverts, upper tail coverts, foreneck, and upper breast metallic green to golden green, changing to bluish green in some with shift in angle of light; three outer tail feathers white with black shafts; others slate to blackish slate; wings, greater coverts and hidden bases of middle and lesser coverts black; posterior under surface intense red,

darkened on lower breast to dark crimson; under wing coverts mixed shining green and dull black.

Female, feathers on side of head shorter, so that nostril is not covered; crest bushy, not compressed laterally; upper tail coverts in maximum development extending only slightly beyond tail; middle wing coverts long, but shorter than in male; crown and side of head metallic bronze-green; rest of upper surface metallic golden green; tail slaty black, with the three outer feathers barred broadly with white toward the tip; wings, including greater coverts and the bases of the lesser and middle coverts, black; primaries broadly edged with buff; chin and throat brownish gray; lower foreneck and upper breast metallic green; lower breast, sides and upper abdomen brownish gray; lower abdomen, flanks and under tail coverts red.

Nestling, above sooty brown, with scapulars and wing coverts mottled heavily, and wing feathers edged, with buff to tawny; breast pale dull cinnamon-buff, edged with grayish brown; lower breast and abdomen white, barred on the sides with grayish brown; short, stubby tail with outer feathers white, central pairs brownish black.

Male, iris dark brown; bill yellow; tarsus and toes olive to dull brown; claws fuscous-black, with the lower margin dull yellow.

An adult female taken at about 2,000 meters on Volcán Barú, February 24, 1965, had the iris dark brown; maxilla black; mandible dull yellow, tinged with dull green toward base; tarsus and toes dull green; claws black.

Measurements.—Males (10 from Chiriquí), wing 190-204 (193.4), tail 157-175 (163.9), culmen from base 21.9-26.3 (23.5), tarsus 19.1-20.8 (19.9), longest upper tail coverts 512-698 (615) mm.

Females (10 from Veraguas, Chiriquí, and Costa Rica), wing 185-195 (190.8), tail 156-184 (172.2), culmen from base 21.0-25.8 (23.3), tarsus 19.4-21.2 (20.1) mm.

Resident. Locally fairly common in the Subtropical and lower Temperate Zones in the mountains of Chiriquí, Bocas del Toro, and Veraguas.

The quetzal is an inhabitant of mountain forests, best known at the present time from Chiriquí. P. L. Sclater published the first account of it in Panamá (Proc. Zool. Soc. London, 1856, p. 139), when he listed it in a small collection of birds and mammals received from Thomas Bridges. According to the collector, the bird was found in "the dense forest on the Boqueti." Salvin (idem, 1870, pp. 202-203) reported specimens taken by Arcé at Calobre and Calovévora in Veraguas. Following this W. W. Brown, Jr., found the quetzal



FIGURE 45.—Quetzal, male,
Pharomachrus mocinno cos-
taricensis.

common on the slopes of the volcano in the Boquete area, where according to Bangs (Proc. New England Zool. Club, vol. 3, 1902, p. 31), he recorded it across the mountain slopes to the Caribbean side. In Veraguas in early 1926 Benson secured it in the mountains back of Chitra, according to Griscom (Amer. Mus. Nov. no. 280, 1927, p. 2). In modern times these birds have become well known on the middle and upper slopes of the Chiriquí volcano, both in the Boquete area, and on the western side near Bambito and Cerro Punta.

Because of large size and the attractive plumage of the male the quetzal comes under heavy hunting pressure as human settlement and activities increase near its haunts. It is threatened further as forests are destroyed. In March 1954, I found them fairly common on the ridge above the road-crossing on the Silla de Cerro Pando west of El Volcán. Here, as many as 6 or 8 ranged in close association at an elevation of 1,700 meters. They still were present here in 1960, but in lesser number. On February 9 that year I watched a pair at a nest hole 12 meters above the ground in a dead stub a meter thick that stood in partly cleared forest. In 1965 their number in this area had been much reduced. A good many are killed for their beautiful tail plumes; others are shot as game to eat. Some of the birds persist under these adverse conditions where forest remains, but the species is one that definitely needs protection. Happily they are still common in forested areas on the slopes of Barú, above the lava flows back of El Volcán, and in some of the more inaccessible areas behind Cerro Punta and Boquete.

Males in life are highly attractive from their colors and their graceful plumes, particularly in their undulating flight, when the long upper tail coverts stream gracefully in the air. They have a variety of calls, among them a curious rattling note that carries for some distance. I have heard mewing, whining, complaining notes also that are unlike those of other trogons with which I am familiar. Their common food is the fruits of forest trees. They fly out to seize these drupes without perching, as is usual in trogons.

Beddard (Struct. Class. Birds, 1898, p. 202) noted "oil gland nude." In checking, I found this true, but the structure was so small that it appeared not to be functional. Quetzals show the narrow ring bare of feathers around the neck immediately below the head, found in the species of this family. At Cerro Punta the quetzal was called *guaco*.

The following notes on the life history of this subspecies are from the detailed studies of Skutch (Condor, 1944, pp. 213-235) made in

Costa Rica. He found the breeding season, during which two broods were reared, to come from early April to August. The second family was reared in the same nest as the first, where this was possible. Old holes of the larger woodpeckers may be used, or male and female, working alternately, may excavate a nest hole in decaying wood. Two eggs appear to be the normal set. These are laid on the floor of the cavity without nest lining. One egg that he examined measured 38.9×30.2 mm. Both male and female incubate, the male during part of the forenoon and afternoon, the female at night and in the middle of the day. In this duty the male as he enters turns around to face the nest opening so that the long tail plumes are curled around, usually with several inches of the tips projecting outside the hole. This in spite of country tradition, cited by Skutch (and that I have heard on various occasions) that the male faces the back of the hole with the tail plumes outside. Incubation required 17 to 18 days. At hatching the young are naked, without down, and with the heel of the tarsus studded with protruding papillae.

For the first 10 days the young were fed on insects, and then were given the usual diet of fruits mixed with land snails, small lizards, frogs, and large insects. Large seeds regurgitated following digestion accumulated in the nest in quantity as the young grew. Coleopterists may be interested to learn that the golden scarabaeid beetle (*Plusiotis*), sought by collectors, is recorded as one of the food items.

Skutch (*loc. cit.*, p. 222) wrote of one nest that the eggs are "light blue in color." Schönwetter (*Handb. Ool.*, pt. 11, 1966, p. 684) recorded the color as "blaugrün bis mehr blau." One in the U. S. National Museum collected by José Zeledón at La Palma, Costa Rica, March 15, 1877, is slightly more bluish than the light mineral gray of Ridgway's *Color Standards and Color Nomenclature*. It measures 37.8×29.1 mm.

The northern race of the species, *Pharomachrus mocinno mocinno*, found from northern Nicaragua through Guatemala to Chiapas, differs in being slightly larger (male, wing usually 204-218 mm., tail 197-215 mm.), with the elongated plumes nearly twice as broad, averaging longer (650-957 mm.) and more golden green. Ridgway remarked (*U. S. Nat. Mus. Bull.* 50, pt. 5, 1911, p. 739) that the longest supracaudal plume in one lot of 100 *P. m. costaricensis* was only 774.5 mm., and in an additional group of 77 was 787 mm. He noted also that in the entire series none of the plumes were as wide as in the typical subspecies.

The current inclusion of *Pharomachrus antisianus* (d'Orbigny), found in the Andes from north-central and central Colombia, the Sierra de Perijá on the boundary between Colombia and Venezuela, and the Mérida range of the latter country, south through Ecuador and Perú to Bolivia, as a race of *P. mocinno* is difficult to understand in view of the clear statement of its characters by Ridgway (*loc. cit.*, pp. 734-735, in key). In brief, this southern representative of the quetzal group, far distant from *mocinno* in terms of space, differs distinctly in having the feathers of the posterior half of the crown short and of normal form, the narrowed, laterally compressed crest restricted to the anterior half of the head, and the supracaudal plumes short, extended only a few millimeters beyond the tail. In addition, on comparison of skeletons I find its characters, while generally similar to those of *P. mocinno*, such as to indicate specific difference. The close relationship should be expressed by two specific groups in a superspecies. The specific name *antisianus* of the South American bird, incidentally, is of interest for its derivation. D'Orbigny (Voy. Amer. Mérid., vol. 4, 1839, p. 154) refers to the Indians of the eastern slopes of the Andes of Perú and Bolivia as the "Antisien," a name derived from the Quechua term "Antis" for this geographic area (modified in Spanish to "Andes"). It appears then that the name *antisianus* for the trogon that d'Orbigny found in the Yungas of Bolivia east of the Andes has this base for its derivation. While he called it *antisianus* in the original description (Mag. Zool., vol. 7, 1837, cl. 2, pl. 85 and text) which is the valid name, in his later volume in 1839 (*loc. cit.*, p. 381) he modified this to *antisiensis*.

PHAROMACHRUS PAVONINUS AURICEPS (Gould):
Golden-headed Quetzal, Viuda de la Montaña

FIGURE 46

Trogon (Calurus) auriceps Gould, Ann. Mag. Nat. Hist., vol. 9, May 1842, p. 238. ("The Cordillerian Andes" = Quito, Ecuador.)

Generally similar in color and its pattern to the quetzal, but nostrils exposed; without appressed crest feathers; supracaudal plumes in maximum development only a few millimeters longer than tail.

Description.—Length 325-355 mm. Adult male, entire head, including throat, shining golden green with coppery reflections; lower hindneck, back, rump, and lesser and middle wing coverts somewhat bluish green to yellowish green; elongated upper tail coverts bordered distinctly with light yellowish green; wings and middle coverts black; tail black, in some individuals with the two outer feathers tipped

slightly with grayish white; lower foreneck, upper breast, and under wing coverts like back; rest of under surface brilliant red.

Adult female, crown and sides of head dull golden olive-brown; rest of upper surface like male, but with the primaries, except the outermost, edged with dull brownish buff; throat brownish slate, with a faint wash of golden brown; rest of foreneck rather light dull green; breast, sides, and upper abdomen brown; lower abdomen and under tail coverts clear red; tail black with the two outer feathers on either side tipped with white.

Male, bill yellow, iris brown, tarsus and toes fuscous to olive-brown.

Female, bill dull brown, slightly paler on lower side of mandible; iris and tarsus as in male.

Measurements.—Males (10 from Darién and Colombia) wing 185-196 (190.3), tail 155-177 (164.8), culmen from base 19.7-25.0 (22.5), tarsus 18.7-22.1 (20.1) mm.

Females (9 from Darién, Colombia, and Ecuador) wing 178-199 (189.3) tail 157-172 (163.5), culmen from base 20.3-25.0 (22.9), tarsus 19.7-20.9 (20.1) mm.

Resident. Found locally on the higher elevations of Cerro Pirre, Darién.

This was one of the interesting additions to the birds of Darién in the collections made on Cerro Pirre by E. A. Goldman in 1912. The little known of the bird is found in the brief notes left by the collector. On April 12 he established a camp near the head of Río Limón at 1,575 meters elevation. His first observation of this trogon was on April 17, when a pair passed through the tall trees near camp. The series of 7 that he collected were taken between that date and April 29, mainly between 1,525 and 1,585 meters, with 1 slightly lower down at about 1,375 meters. He recorded them as having rapid wing strokes, and with flight mainly in a direct line. Those taken were in breeding stage. He mentioned especially their calls, unlike those of other trogons, which varied from cawing sounds, like the utterance of crows, to others that suggested the loud notes of the laughing falcon.

Griscom's inclusion of this species (Bull. Mus. Comp. Zool., vol. 78, 1935, p. 325) from "Mt. Pirri, Darién (fide Chapman)" probably was based on Goldman's specimens. The summit of the Pirre range has been little visited. The only other record of this trogon known to me from this area is a female in the Gorgas Memorial Laboratory taken by R. Hinds on August 7, 1965.

I have examined the egg listed by Schönwetter (Handb. Ool., pt. 11, 1966, p. 686) in the British Museum, which I find had been cracked but carefully mended. It was collected by T. K. Salmon at Frontino in Antioquia, Colombia. In color it is grayish blue, in form short subelliptical, and in size 37.3×29.4 mm. (slightly longer than the 37.0 mm. given by Schönwetter).

The skins in the Gould collection in the British Museum from which this bird was named are marked "Quito."



FIGURE 46.—Golden-headed quetzal, viuda de la montaña, *Pharomachrus pavoninus auriceps*.

TROGON MASSENA HOFFMANNI (Cabanis and Heine):
Masséna Trogon, Aurora

FIGURE 47

Trogon Hoffmanni Cabanis and Heine, Mus. Hein., pt. 4, sect. 1, 1863, p. 204, footnote. (Costa Rica.)

Large; adult with tail dark-colored, with no prominent white marking, lower breast and abdomen bright red; tail slightly shorter than wing; female like the long-tailed trogon, *Trogon melanurus*

macroura, but slightly darker gray; bill larger, broader, more than 22 mm. wide at base.

Description.—Length 300-350 mm. Adult male, upper surface metallic green, varying to bluish green on crown, rump and upper tail coverts, or to golden green on the back; four central rectrices metallic green to bronze-green, tipped with black, those adjacent black, but more or less metallic green on the outer webs, the outermost wholly black; the external pairs and usually the two adjacent, freckled lightly and indistinctly, especially toward the base, with dull white; wing coverts and outer webs of the secondaries lined irregularly and narrowly with black and white; primaries dull black, the outermost edged slightly with grayish white; side of head and throat dull black; upper breast shining metallic green to bronze-green; lower breast, sides, abdomen, and under tail coverts bright red; under wing coverts slate, lined narrowly with dull white; tibia blackish slate.

Adult female, above slate color, darker on the sides of head, chin, and tail; wings blackish slate, with the primaries usually edged narrowly with white; wing coverts and outer webs of secondaries minutely and indistinctly freckled with grayish white; foreneck and breast grayish slate color, usually paler than the back; breast in some barred lightly and indistinctly with grayish white and dull black; rest of under surface as in male.

Immature, similar to adult in both sexes, but with lateral rectrices tipped and barred narrowly with dull white.

An adult male, collected near the Río Chiriquí Viejo, west of El Volcán, Chiriquí, February 25, 1954, had the iris hazel; thickened margin of eyelid dull red; entire bill deep orange-red; tarsus, toes, and claws light brown; under side of toes dull yellow. Another adult male, from the Río Tacarcuna, Darién (at 575 meters), March 13, 1964, had the iris very pale yellowish orange; thickened ring of the eyelids rose-red, with the bare skin above and below pale dull green; scutes on front of tarsus, tops of toes and claws dull yellowish brown; sides and back of tarsus dull yellowish gray.

An adult female, collected at Juan Mina, Canal Zone, January 17, 1961, had the iris orange-brown; maxilla dusky neutral gray, with the base, below the nostril, and the mandible, dull orange; tarsus and toes light wood brown; claws fuscous on sides, with tip black. The bill color in this bird was of the usual pattern found in females throughout Panamá. Variation is shown by an adult female (laying) from Puerto Armuelles, Chiriquí, February 6, 1966, in which the

iris was orange-red; tip of gonys and a narrow line on either side orange-yellow, with the rest of the bill black. Two from El Volcán resembled it and one from Santa Clara, Chiriquí, had the bill wholly black.

Immature males that I have examined have had the bill like the usual pattern in the adult female.

Measurements.—Males (19 from Panamá) wing 165-174 (170.3), tail 154-168 (161.0), culmen from base 24.8-27.7 (25.9), tarsus 16.2-18.3 (17.3) mm.

Females, (17 from Panamá), wing 164-175 (168.8), tail 154-169 (162.0), culmen from base 24.1-27.1 (25.2), tarsus 16.1-18.5 (17.4) mm.

Resident. Common throughout the Tropical Zone; found regularly in the lower Subtropical Zone in Chiriquí and Darién.

The Masséna trogon primarily is a forest bird, but one adaptable to the degree that it may range in the shade trees over coffee, in the taller trees that border streams on the savannas and grow in narrow stands in lowland marshes, and it may even range in mangroves. It is fairly common to 1,400 meters near El Volcán and Santa Clara in western Chiriquí. I recorded it also at about 900 meters on Cerro Campana. In Darién we encountered it on the mountain slopes on the Río Tacarcuna at 575 meters, and at La Laguna at about 900 meters. Goldman collected 1 near 1,100 meters on Cerro Pirre.

The far-reaching call of the male—a repetition of a single note that begins slowly, increases in rapidity until it reaches a rattling cadence, and then terminates abruptly—is one of the jungle voices heard constantly in forested country. The birds are especially vociferous in early morning, when their constantly repeated notes give a measure of abundance of the species. As they rest usually among leafy branches, and are not active except when feeding, they may be seen infrequently though heard regularly. Usually they are above such a heavy screen of leaves that careful search may be necessary to detect them. On the other hand, occasionally they have come out on open perches to watch curiously when I have searched for birds that have fallen in undergrowth, or when I have been resting quietly to observe the life of the forest. Their flight is rapid and strongly undulating.

The common nesting site is a tunnel excavated in one of the arboreal termite nests that are so common in the forest. As the walls of the termite runs that are broken are sealed immediately by the insects, the cavity forms a suitable home. I have observed pairs

of the birds at such nest holes, or working on them, on numerous occasions. Skutch (Ibis, 1966, pp. 8, 10) has found their nests also excavated in rotting tree trunks. The tail of females taken from the middle of February to the middle of April often is badly worn, evidently from abrasion in the nesting cavity. Gross (Nature Mag., 1930, pp. 249-250) on Barro Colorado Island, June 28, 1927, found 2 eggs in a nest tunnel dug in a termitarium. These he described as light bluish white, with weights of 12.5 and 12.2 grams, and measure-



FIGURE 47.—Masséna trogon, aurora, *Trogon massena hoffmanni*.

ments of 35.2×27.1 and 33.5×27.0 mm. Incubation was shared by male and female. The tunnel was wet and slimy from the daily rains. The young on hatching, completely naked "without a vestige of down," were fed on winged insects.

The measurements of 4 eggs listed as those of nominate *massena* by Schönwetter (Handb. Ool., pt. 11, 1966, p. 686) from "S. Mexico to Nicaragua" appear to be wrongly identified, as they agree with those of smaller species of trogon.

The Masséna trogon comes regularly with others of the family to feed on drupes of forest trees, and also eats large insects. The

stomach of a female taken near Cana, in Darién, held 2 large locustids, 2 sphingid caterpillars, fragments of a very large beetle, a cerambycid, and remains of drupes.

There has been some uncertainty in published descriptions of the color of the eyelids in this species. Nutting (Proc. U. S. Nat. Mus., vol. 6, 1884, p. 407) during work in Nicaragua recorded this as "bare circumorbital space sky blue." This was reported by Ridgway (U. S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 744), with a reference to Nutting, as "naked eyelids sky blue." Aldrich (Cleveland Mus. Nat. Hist. Sci. Publ., vol. 7, 1937, p. 75) queried this, with the statement that "the naked eyelid . . . was red rather than sky blue as given by Ridgway." In life in adult males I have found the thickened margin of the eyelids colored dull red to rose-red, with the bare skin above and below dull green.

As no trogons are known from the Archipiélago de las Perlas, the report by Bovallius (Resa; Central-Amerika 1881-1883, vol. 1, 1887, p. 138) of a Masséna trogon seen between April 22 and 24, 1882, on Isla Pedro González must be regarded as in error. Rendahl (Ark. Zool., 1920, p. 33) in a report on collections made by Bovallius included this record but with doubt as to the species.

The species *massena* was named by Gould to honor Prince Francis Victor Masséna for his interest in "the science of zoology." The race *hoffmanni* was dedicated to Dr. Hoffmann, companion to two other Germans, Dr. A. von Frantzius and Dr. Ellendorf, pioneer collectors in Costa Rica, whose specimens went to the Berlin Museum. The name *aurora* is given to these birds in Panamá by those who distinguish them from the smaller trogons. Among those who speak English in Bocas del Toro they are called the "mountain parrot." The Masséna trogon also is known as the slaty-tailed trogon.

Trogon massena as a species ranges from Oaxaca and Veracruz, México, south through Central America and western Colombia to northwestern Ecuador. From Jurubidá and Nuquí, central Chocó in northwestern Colombia southward males have the central rectrices bluish instead of the brass green found in the northern group. On this character they are separated as the race *Trogon massena australis* Chapman. Coloration through the area to the north is uniform but there is a cline in size, with the birds larger from México through Honduras, smaller from Costa Rica and Panamá to the Río Juradó, the falls on the Río Truandó, and the lower, eastern slopes of Cerro Tacarcuna in extreme northern Chocó, Colombia. Intergradation between the two size groups comes in Nicaragua.

Measurements of the southern group, which have been separated as the race *hoffmanni* are given above. Northern birds (*T. m. massena*) have the following dimensions:

Males (10 from Veracruz, Chiapas, Guatemala, and Honduras), wing 176-181 (177.3), tail 170-193 (176.0), culmen from base 25.3-28.1 (26.6), tarsus 17.0-18.5 (17.8) mm.

Females (10 from Veracruz, Campeche, Oaxaca, Guatemala, and Honduras), wing 172-181 (176.6), tail 170-180 (175.0), culmen from base 25.0-27.8 (26.3), tarsus 17.2-18.4 (17.9) mm.

Though the size difference in wing and tail is evident, some have questioned the separation in two races. From present information it seems desirable to recognize them.

TROGON MELANURUS MACROURA Gould: Long-tailed Trogon,
Aurora Colilarga

Trogon macroura Gould, Mon. Trogonidae, pt. 3, 1838, pl. [5] and text [= pl. 17 in complete volume]. (Río Atrato, Colombia.)

Like the Masséna trogon (*Trogon massena hoffmanni*) except that the tail is slightly longer than the wing; the male with a white line across the chest between the metallic green and the red of this area and the central rectrices blue to bluish green; female slightly paler gray on upper surface, foreneck and upper breast; bill slightly smaller, narrower, less than 22.0 mm. broad at base.

Description.—Length 290-330 mm. Adult male, above metallic green varying to slightly golden or bluish green; central rectrices bluish to bluish green, outer pairs dull black lightly freckled with grayish white, principally on the outer web; wing coverts and outer webs of secondaries barred narrowly and irregularly with black and grayish white; primaries and primary coverts dull black, the primaries edged lightly on the outer webs with white; forehead, side of head, and throat black; lower foreneck and upper breast metallic green, bordered below by a narrow band of white; lower breast, sides, abdomen, and under tail coverts deep red; under wing coverts slate, banded narrowly with white; tibia slaty black.

Adult female, upper surface and throat light slate; side of head and wing coverts blackish slate, the latter mottled indistinctly with dull grayish white; primaries, primary coverts, and tail slaty black; upper breast and sides pale slate; rest of under surface rather light bright red.

An adult male, taken February 5, 1961, at 460 meters elevation on

Cerro Pirre, Darién, had the thickened edge of the eyelids red of a shade slightly paler than the breast; iris brown; bill deep yellow; front of tarsus and toes greenish brown; claws wood brown. Another adult male, collected February 7, 1962, at Cañita, Panamá, differed slightly in having the iris wood brown; bill light honey yellow; tarsus dusky neutral gray; toes olive-brown; claws dull fuscous. Further slight variation was found in a male shot March 13, 1963, at Armila, San Blas, in which the bare, swollen edge of the eyelids was orange-red; the iris warm brown; tarsus and toes light olive-green; claws dark neutral gray. The inside of the mouth was yellow.

A female collected February 4, 1962, at El Llano, Panamá, had the edge of the eyelid in general black, interrupted by red on the posterior margin of the lower third, and dotted with red along the anterior two-thirds of upper margin; iris light wood brown; maxilla, including the side down to the level of the nostril, and from there forward to the first notch on the cutting edge, black; rest of the side of the maxilla and the entire mandible light honey yellow; front of tarsus and upper side of toes dull brown; side and back of tarsus dusky neutral gray; claws fuscous-black; lower surface of toe pads dull honey yellow.

Measurements.—Males (10 from eastern Panamá), wing 153-168 (158.6), tail 162-174 (165.3), culmen from base 24.5-26.5 (25.2), tarsus 15.9-17.2 (16.7) mm.

Females (10 from eastern Panamá and northwestern Colombia), wing 152-166 (159.7), tail 159-175 (167.7), culmen from base 23.2-25.5 (24.3), tarsus 15.0-17.5 (16.2) mm.

Birds from far eastern Darién and through the extensive range in Colombia are slightly larger than those from central Panamá.

Resident. Common through the Tropical Zone from the Canal Zone east to the Colombian boundary on both Pacific and Caribbean slopes. Found to 550 meters on Cerro Pirre.

These are forest birds that in habitat and general activities are similar to the Masséna trogon. The voice is like that of the related species, being a repetition of a single syllable, somewhat sonorous when not too far distant, given slowly at first, and toward the end becoming increasingly rapid, until the call terminates in a rapid trill. As a whole the voice differs from that of the companion species *massena* in higher pitch, and more rapid utterance. As both call from perches concealed among leaves, often it is difficult to identify them.

I noted that I collected March 28, 1946, near Jaqué, Darién, was about to lay, but I have made no definite observation as to their breed-

ing, other than frayed tail ends in some of the females. Stomachs that I examined held berries, palm seeds, bits of the pendant flower tassels of the guarumo (*Cecropia*), a walking stick, and other large orthoptera.

Countrymen along the Río Chucunaque believed that to kill one of these birds might bring bad luck. Dr. José Borrero told me that in the middle Río Magdalena in Colombia this trogon was called *canario*.

It is interesting to find two sympatric species apparently so similar as this one and the Masséna trogon. A detailed comparative study of the two in life should be of scientific interest.

TROGON CLATHRATUS Salvin: Lattice-tailed Trogon, Aurora Colirrayada

Trogon clathratus Salvin, Proc. Zool. Soc. London, 1866, p. 75. (Calovévora, Veraguas.)

Tail black, with narrow transverse white lines; eyes light in color, with the bare margin of the eyelids black. Male resembles the Masséna trogon otherwise, but is slightly smaller; female has the breast brown.

Description.—Length 290-315 mm. Adult male, above metallic green to bronze-green, some with the rump and upper tail coverts somewhat bluish green; central rectrices bluish green, tipped with black, those adjacent black, with outer web barred with very narrow rather widely separated white lines, the two outermost with both webs with this marking; anterior lesser wing coverts metallic green like back; outer webs of secondaries and the greater, middle, and posterior area of the lesser coverts finely vermiculated with black and white; primary coverts and primaries black; outer web of the outer primaries edged with white; forehead, side of head, and throat black; lower foreneck and upper breast metallic green; rest of under surface geranium red; tibia slaty black; under wing coverts mixed gray and white.

Adult female, crown blackish slate; rest of upper surface slate; tail tipped with blackish slate, with outer feathers barred very narrowly with white, as in the male; wing coverts and secondaries freckled with white; side of head and throat sooty gray; lower foreneck and upper breast slate; lower breast wood brown; sides slate gray; rest of under surface geranium red; tibia blackish slate; under wing coverts gray, lined indistinctly with grayish white.

Juvenile, upper surface, foreneck, and upper breast warm brown, more rufous on the rump and upper tail coverts; lower breast, sides,

and under tail coverts lighter, more cinnamon-brown; middle and lesser wing coverts white, tipped with brown, and with a narrow sub-terminal bar of slate; greater coverts dusky, edged and barred irregularly with white; inner secondaries with outer webs margined with white, a distal bar of slate edged with dull cinnamon-buff, and the rest of the surface freckled with dull buff to white.

In the American Museum of Natural History collections 2 males taken at Carrillo, Costa Rica, by Austin Smith have the soft parts noted as follows: iris in one cream color, in the other lemon-yellow; bill yellow; bare lower end of tarsus wax yellow. A female, from the same locality and collector, has the iris described as lemon, mandible and base of maxilla below nostril yellow, rest of maxilla black.

An adult male from the upper Río Changuena, Bocas del Toro, collected by R. Hinds, September 11, 1961, has the bare edge of the eyelids black.

Measurements—Males (12 from Panamá and Costa Rica), wing 152.0-160.0 (155.3), tail 141.6-157.0 (146.8), culmen from base 21.5-23.5 (22.3), tarsus 14.9-16.8 (16.2) mm.

Females (9 from Panamá and Costa Rica), wing 153.0-163.0 (157.0), tail 144.0-152.0 (146.9, average of 8), culmen from base 21.0-22.8 (21.6), tarsus 16.0-17.5 (16.6) mm.

Resident. Foothill and lower mountain forests of the Caribbean slope from the Costa Rican boundary in western Bocas del Toro to northern Veraguas.

The distribution of this species as given in early reports included several localities in error due to lack of detail in geographical knowledge. In the original description (1866) Salvin listed it merely as "Hab. in Veragua." The following year (Proc. Zool. Soc. London, 1867, p. 151), with a description of the female, he cites it as found at "Santa Fé; Santiago de Veragua; Cordillera de Tolé" these being merely three points from which Arcé had forwarded specimens, all incorrect, as all are on the Pacific slope. Three years later (idem, 1870, p. 202), in another review of Arcé's collections, he lists *Trogon clathratus* as from "Calovevora" which geographically is correct. This locality, near the headwaters of the Río Calovévora, which flows to the Caribbean, lies between 10 and 15 kilometers west and north of west of Santa Fé, where Arcé was located during part of his early work. Calovévora (spelled Calovévora on some maps) may be accepted, therefore, as the type locality. It is the only place among the several listed by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, p. 505) that is in the range of the species, except for the

inclusion of "Veraguas (Merritt)" as the collections of Dr. Merritt were made on the Caribbean slope. The female described as that of this species by Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 9, 1868, p. 119) from Costa Rica proved later to be a specimen of *Trogon bairdii* (Salvin and Godman, Biol. Centr.-Amer., vol. 2, 1896, p. 497).

Trogon clathratus is little known in Panamá as collecting within its range has been limited. The only recent specimen is a male taken September 11, 1961, by R. Hinds, working under Dr. Pedro Galindo, at a mountain camp at 800 meters on the Río Changuena, Bocas del Toro, in the headwaters of the Río Changuinola.

In Costa Rica, Carriker (Ann. Carnegie Mus., vol. 6, 1910, p. 563) found the lattice-tailed trogon on the Río Sixaola below Cuabre, across the river from Panamá. Dr. Paul Slud from his field notes informs me that he has recorded the species from near that point to the Caribbean slope of Volcán Tenorio in northwestern Costa Rica. His interesting account (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, pp. 165-166) is the only report to date of its habits. He found it—

. . . from the lower tropical belt up to at least 4500 feet, with its center of abundance following the foothills and slopes of the cordilleran core of the country. Probably it reaches the lowlands in many places along the fringing foothills. At any rate I found it not uncommon under these circumstances in the Sarapiquí region. It is completely sympatric with the wide-ranging, very similar, congeneric *massena*. . .

This trogon is found almost exclusively in heavily wooded areas. It is a true forest inhabitant that occurs only occasionally at the forest border or beside it in the shaded semi-open, unlike the broadly tolerant *massena*, and is met singly or as a somewhat separated member of a pair. Its habits appear indistinguishable from those of *massena* in most respects. Vocally, too, it resembles *massena*. Its usual call differs in being higher pitched . . . than the barking notes of *massena*. . . . I would have expected sympatric species so much alike to have very different voices.

The light-colored eye is unusual in this family of birds.

TROGON BAIRDII Lawrence: Baird's Trogon, Aurora de Baird

Trogon bairdii Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 9, April 1868, p. 119. (San Mateo, Costa Rica.)

Medium size; male differs from other trogons with extensive red under surface by its pure white outer tail feathers; female distinguished from other species with foreneck and upper breast entirely slate-gray by the white bars on the tail.

Description.—Length 285-300 mm. Adult male, crown and hind-neck black, in some with a sheen of violet-blue; back, scapulars, anterior lesser wing coverts, and rump metallic green, bluish green, or violet-blue; central rectrices metallic bluish green to violet-blue, tipped with black; three pairs of outer rectrices black on the partly concealed base, broadly white distally; wings and wing coverts (except as noted) black, with the outer primaries edged narrowly with white toward base; sides of head, foreneck, upper breast and anterior areas of sides black; tibia dull black; rest of under surface orange-red; under wing coverts dark gray, tipped narrowly with grayish white.

Adult female, upper surface, including anterior lesser wing coverts slate to slate-gray; rectrices slate-black, the three outer pairs tipped and barred rather narrowly with white; wings black, with secondaries and wing coverts barred very narrowly with white; longer primaries lined narrowly on outer webs with white, others dotted on this area with white; side of head, foreneck, breast, and sides slate-gray; rest of under surface reddish orange, except tibiae which are blackish slate; under wing coverts slate-gray, very faintly marked with white; concealed inner webs of base of primaries and secondaries white.

Juvenile, upper surface and foreneck somewhat brownish slate; lower breast and abdomen grayish slate basally, tipped and barred subterminally with grayish white; under tail coverts grayish white; wings as in adult female; tail also like adult female, but with white tips on the three outer rectrices somewhat larger. (From Museum of Comparative Zoology no. 120867, collected at El General, Costa Rica, July 4, 1908.)

A male, American Museum of Natural History no. 389824, taken at El Pozo, Río Térraba, Puntarenas, Costa Rica, December 2, 1923, by Austin Smith, has the following data: iris dark brown; eyelids pale blue; bill blue; feet lead color.

Measurements.—Males (14 from Chiriquí and Costa Rica), wing 142.0-151.0 (145.5), tail 147.8-151.9 (149.9), culmen from base 22.3-24.7 (23.9), tarsus 14.0-15.8 (15.0) mm.

Females (10 from Chiriquí and Costa Rica), wing 142.0-145.8 (143.6), tail 142.8-151.0 (147.4), culmen from base 22.2-23.6 (22.9), tarsus 14.4-15.5 (14.9) mm.

Weight, male, 93.71 grams (F. A. Hartman).

Resident. Found in Tropical and lower Subtropical Zone forests in western Chiriquí.

This interesting trogon, described from Costa Rica in 1868, has

been little known in Panamá. Arcé, the first to secure it in the Republic, forwarded specimens from Bugaba. From these Salvin (Proc. Zool. Soc. London, 1870, p. 202) published the first description of the female since Lawrence, when he named *bairdii* from 2 male individuals, wrongly listed the female as that of *Trogon clathratus*. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, pp. 496-497) added Bibalaz, Chiriquí, to the range, from other early specimens taken by Arcé. They were in error in the further inclusion of "Veraguas (Merritt)" with the statement "Long prior to the description of this species by Lawrence, specimens were secured by Dr. Merritt in Veraguas, and were in his collection when Salvin examined it in 1874," as this refers also to *clathratus*. This is shown by Salvin (Ibis, 1874, p. 329) in his description of his visit to Merritt, and is verified by Salvin and Godman (*loc. cit.*, pp. 504-505) in their account of *T. clathratus*. The next report of specimens of *Trogon bairdii* was by Bangs (Auk, 1901, p. 360) who recorded 12 taken by W. W. Brown, Jr., at Divalá, Chiriquí, in November and December 1900. Apparently, the next record is that of a male, now in the U.S. National Museum, taken by Dr. F. A. Hartman at about 1,375 meters elevation at Santa Clara, Chiriquí, on February 28, 1958.

The species ranges in southwestern Costa Rica where Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, p. 166) reports it as locally common. He records it as sympatric with *Trogon massena* "the two being found commonly together in some places, uncommonly in others. Like *massena* it is a forest inhabitant that also enters the neighboring well-shaded semi-open. It frequents all vegetation levels above shrub height and even descends to eye level. Unusually among Costa Rican trogons, it occurs in small groups more often than singly or in two's. It differs in color of plumage and soft parts but resembles *massena* in voice. Its call . . . starts slowly, like that of *massena*, then speeds up and bounces along with increasing strength, and ends by slowing and dropping in pitch. Another, similar cry, not unlike that of the Quetzal, is a rapid, chickenlike cackle, higher in the middle portion; the bird also makes a weak cackle more like that of other trogons."

Peters (Check-list Birds World, pt. 5, 1945, p. 152) has included *bairdii* as a geographic race of *Trogon* "*strigilatus*." It is obvious that the two are closely related but it seems more appropriate to list them as distinct species, in view of their definite color differences in which *bairdii* is red on the abdomen in both sexes, and has the tail in the female more evenly barred to the end. In *Tragon viridis chionurus*, found from the Canal Zone eastward to Darién, and through much

of Colombia, the abdomen is yellow to somewhat orange-yellow, and the tail in the female has the white more prominent, especially at the tip. The two are nowhere in contact, their ranges being separated by half the length of the Isthmus.

When Deignan (U.S. Nat. Mus. Bull. 221, 1961, p. 190), in the list of type specimens of birds in National Museum collections, noted that the type of *Trogon bairdii* should have been labeled "Turrialba (not San Mateo), Province of Cartago, Costa Rica" he copied a notation on the card covering this bird in the Museum's species catalog. This entry was an error, as the bird is one of the Pacific slope, and Turrialba is on the Caribbean side. San Mateo, in southern Guanacaste on the Pacific side is to be accepted as the correct locality.

TROGON VIRIDIS CHIONURUS **Sclater and Salvin: White-tailed Trogon, Trogón Coliblanca**

Trogon chionurus Sclater and Salvin, Proc. Zool. Soc. London, 1870 (April 1871), p. 843. (Lion Hill, Canal Zone, Panamá.)

Trogon eximius Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 10, March 1871, p. 11. (Lion Hill, Canal Zone, Panamá.)

Medium size; male with outer tail feathers pure white, and abdomen orange-yellow; female with upper surface, breast, and sides slate-gray, abdomen like male.

Description.—Length 265-280 mm. Adult male, entire head, neck, and upper breast black, with a slight sheen of violet; rest of upper surface metallic bluish green to violet-blue, in some entirely violet-blue, in others center of back green, with violet-blue on upper back, rump, and upper tail coverts; central rectrices greenish blue to bluish green, the adjacent two pairs similar on the outer web, but with the inner web black, these four pairs tipped with black; three outer pairs pure white, with the base, concealed under the under tail coverts, black; entire wing black with the outer primaries narrowly edged with white; lower breast dark bluish violet; sides slate-gray; abdomen and under tail coverts orange-yellow; tibia black.

Adult female, entire head, upper surface, neck, breast, and sides blackish slate; three central pairs of rectrices slate-black; the three outer pairs slate-black, tipped broadly and barred distally with white, the outer web of the outermost barred throughout with white; wings black with the primaries edged on the outer web with white, this marking changing distally to a series of dots; secondaries, greater, middle, and distal half of lesser wing coverts barred with very narrow

white lines; abdomen and under tail coverts orange-yellow; tibia blackish slate.

Immature male, in first plumage, like female but with the outer rectrices black, barred in varying extent with white; white marking on inner primaries broader, more prominent.

An adult male, taken near Armila, San Blas, February 23, 1963, had the iris dark reddish brown; thickened ring of the edge of eyelids light blue; bill bluish white; bare lower end of tarsus and toes dark neutral gray; claws fuscous-black. Another of this sex, from Pucro, Darién, February 1, 1964, had the iris warm brown; thickened rim of eyelids pale grayish blue; bill pale greenish blue; bare lower end of tarsus and toes fuscous-black, with divisions between the scutes whitish; claws fuscous.

A female taken with the male last described, had the iris, eye-ring, tarsus, and toes like the male; maxilla below nostril and mandible bluish neutral gray; rest of maxilla black. Another female collected at Juan Mina, Canal Zone, January 23, 1961, had the iris dark brown; thickened edge of eyelids light blue; base of maxilla and mandible grayish blue; rest of maxilla dull black; tarsus and toes neutral gray.

Measurements.—Males (10 from eastern Panamá), wing 131.0-138.0 (135.0), tail 136.0-144.0 (139.1), culmen from base 22.0-24.4 (22.7), tarsus 14.2-14.9 (14.5) mm.

Females (10 from eastern Panamá), wing 131.0-139.0 (134.7), tail 134.0-143.0 (139.3), culmen from base 21.0-23.3 (21.7), tarsus 13.0-14.9 (13.9) mm.

Resident. Common on the Caribbean slope in the tropical lowlands from central Bocas del Toro (Chiriquí Grande), northern Coclé (Cascajal) and the lower Chagres Valley (Juan Mina to Gatun) in the Canal Zone, east through eastern Colón (Portobelo) and all of San Blas (Mandinga, Armila, Puerto Obaldía); crossing to Darién on the Pacific side in the Tuira Valley (Boca de Paya, Pucro), to range eastward (through Garachiné, Jesucito, Jaqué) to Colombia; to 550 meters elevation on Cerro Pirre (Cana).

In addition to the range as outlined there is one report from western Panamá that appears to be erroneous. Gould (Mon. Trogonidae, 1875, pl. [22] and text) in his account of *chionurus* included a note from Salvin which mentioned specimens collected by McLeannan in what is now the Canal Zone, and said further that the bird "does not seem to extend its range into Central America beyond the railway . . . as our collector Arcé did not meet with it in the district of Vera-gua." Later Salvin and Godman (Biol. Centr.-Amer. Aves, vol. 2,

1896, p. 495) listed the distribution in Panamá as "Veraguas (Arcé), Lion Hill (McLeannan)" with the statement that the "range is now found to be a little more extended as Arcé sent us an adult male from Veraguas." I have seen this specimen, now in the British Museum, and find that the label reads only "Veragua, Arcé, 1875." The locality seems too uncertain for acceptance, as it is possible that the specimen came from McLeannan at Lion Hill, on the Panama Railroad.

The record of a specimen reported by Griscom (Auk, 1933, p. 301), in the collection of Henry O. Havemeyer, taken by Austin Paul Smith, labeled "Chiriquicito Grande" (=Chiriquí Grande), Bocas del Toro, May 2, 1927, marks a point far to the west of any other report. In an examination of the Havemeyer specimens, now in the Peabody Museum at Yale, I have seen this skin, a male, which is marked as stated. There is no other record of the species in the area, though the region has been worked extensively by several naturalists. In the U.S. National Museum there are 3 skins purchased from Heyde and Lux, labeled Cascajal, Coclé, February 19, and March 13 and 17, 1889. The Río Cascajal is a tributary of the Río Coclé del Norte on the Atlantic slope north of La Pintada. H. T. Heyde, who was in that area from the beginning of February until late April 1889, noted that the trogons were taken in heavy forest.

The white-tailed trogon seems more adaptable than some of the family, as it ranges in fairly open areas in forests, and also may be found in the larger, more mature stands of second growth. During the dry season I have encountered them regularly in pairs with male and female remaining near one another. They seem to have more curiosity than others of the family, as often they have come to chatter at me with a series of rapidly uttered notes—*chook chook chook*—accompanied by spreading tail which is vibrated slightly with the white outer feathers shown prominently. An ordinary call of the male is a single note *cwoh* repeated steadily many times.

While these birds are active in feeding on various drupes which they fly out to seize on the wing, they also take insects. One stomach that I examined held bits of large ants, and another a small phasmid.

March 11, 1946, on Barro Colorado Island, Canal Zone, I found a pair nesting in a hole dug in a small termite nest located in a tree beside one of the laboratory buildings. Chapman (Life in an Air Castle, 1938, p. 231) recorded a similar nesting site. Eisenmann (Smithsonian Misc. Coll., vol. 117, no. 5, 1952, p. 28) saw these birds feeding young in a similar nest site on June 27, 1950.

An egg in the British Museum collection, taken by T. K. Salmon

at Remedios, Antioquia, in northwestern Colombia, is dull white with a faint gloss, short oval in form, with measurements of 28.7×24.2 mm. According to the collector (Sclater and Salvin, Proc. Zool. Soc. London, 1879, p. 535) this bird nests "in the holes of palm trees, and lays two white eggs."

In comparison of my series taken in Panamá with a similar group of skins recently collected for us by Carriker in northwestern Colombia I note that females in the Colombian group average slightly grayer on the dorsal surface so that it may prove that the more southern birds should be recognized as distinct. I note also that male, female, and immature male, taken February 1, 1964, at Pucro, Darién, probably a family as they were near together, have decidedly heavier bills than any others seen.

Linnaeus (Syst. Nat., ed. 12, vol. 1, 1766, p. 167) listed this species from Brisson's descriptions under two names, *Trogon strigilatus*, which is the female, and *Trogon viridis*, the male. Both names have been used, with *strigilatus* accepted in most recent accounts. Zimmer (Amer. Mus. Nov. no. 1380, 1948, p. 26) however, has pointed out that Burmeister (Syst. Uebers. Thiere Brasiliens, vol. 2, 1856, p. 277) who cited both names, from Linnaeus, as first reviser selected *viridis*, the term covering the male, for the species, with *strigilatus*, from the female, as a synonym. From this under the Rules of Nomenclature *viridis* is the valid name for the species.

With regard to the name *chionurus*, current for this race, it is indicated in the heading above that this dates from April 1871. *Trogon eximius* Lawrence, also for this race, questionably dated February, March 1871, possibly may be older. The Annals of the Lyceum of Natural History of the period in question were issued by the society in installments. Lawrence's paper entitled "Descriptions of New Species of Birds from Mexico, Central America, and South America, with a note on *Rallus longirostris*," was read before the Society on January 30, 1871, and was printed in volume 10, pages 1 to 21. At the bottom of page 1 is the date February 1871. It was followed in the journal by a paper by Bland and Binney, which begins at the top of page 22, on the reverse of the last sheet of Lawrence's contribution. Lawrence had separates printed also, from the same type, without the heading "Annals of the Lyceum of Natural History," and with the back of page 21 blank, but otherwise identical with the volume, as is shown by copies in our library. It may prove, from evidence not at present available, that these were distributed in February or

March, as is indicated questionably by C. W. Richmond in his index card for this name.

TROGON COLLARIS Vieillot. Collared Trogon, Trogón Acollarado

FIGURE 48

Trogon collaris Vieillot, Nouv. Dict. Hist. Nat., nouv. éd., vol. 8, March 1817, p. 320. (Cayenne.)

A small trogon; lower breast and abdomen red; a broad white band across upper breast in both sexes.

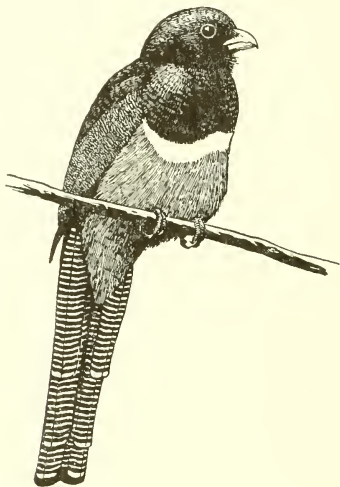


FIGURE 48.—Collared trogon, trogón acollarado, *Trogon collaris*.

Description.—Length 240-270 mm. Lower half of tarsus bare. Adult male, upper surface, from mid-crown to upper tail coverts, including anterior lesser coverts and central tail feathers, metallic golden green, varying to grass green, occasionally to bronze; two pairs of rectrices adjacent to central pair with inner web black and outer web metallic green, all (including the middle pair) tipped with black; three outer pairs black, barred rather narrowly with white except on the base of the inner web of the fourth pair; wings black, with the outer webs of the longer primaries edged with white; outer

webs of secondaries, and greater, middle, and lesser coverts (except the anterior rows), lined narrowly and irregularly with white; a femoral tuft on either side white basally, red distally; forehead, side of head and throat black; foreneck and upper breast metallic green to golden green; a prominent white band across center of breast, with the uppermost feathers basally black; sides gray, banded slightly and indistinctly with black; rest of under surface geranium red; tibia and feathers of upper half of tarsus black; under wing coverts dark gray, tipped lightly with white; bases of inner primaries and secondaries white.

Adult female, above brown, darker on the crown, somewhat more rufescent on the rump and upper tail coverts; middle pair of rectrices chestnut tipped with black; next two pairs black on inner web, chestnut on outer web; three outer pairs black on dorsal surface, grayish underneath, tipped with white, with a narrow subterminal bar of black; outer webs edged with white, freckled with gray, narrowly toward base, broadly distally; wings slaty black, the longer primaries edged with white; outer webs of secondaries, and greater, middle, and lesser coverts brown, minutely lined and freckled with dusky; a white eye-ring broken and indistinct anteriorly, broad on posterior margin; side of head slaty black; throat grayish slate; upper breast and sides brown like back; a broad white breast band, but without the black upper border found in the male; rest of under surface as in male.

The collared trogon is found from southern México through Central America and South America (including Trinidad and Tobago) south to Perú, Bolivia, and southern Brazil (not recorded to date from Surinam). Though eight geographic races have been recognized in this area all are closely similar in general appearance. Three of these are found in the Republic. Males of the several subspecies of South America and the population of Cerro Pirre in eastern Darién have the white tip of the three outer rectrices from three to six times wider than any of the white bars on the upper part of these feathers. In adult males of the wide ranging subspecies *puella*, and the local race of the Tacarcuna region in Panamá, this terminal white tip is only slightly broader than those adjacent above. However, the young male in first adult dress of these more northern birds has this marking broad as in the southern group, an apparent relict character that has disappeared in the adult.

TROGON COLLARIS PUELLA Gould

Trogon puella Gould, Proc. Zool. Soc. London, pt. 13, April 1845, p. 18.
(Escuintla, Guatemala.)

Characters.—Adult male with terminal white tip on the three outer rectrices narrow, only twice, or slightly more, wider than the adjacent black bar; black of throat somewhat more extensive; mottled pattern on secondaries and wing coverts blacker; female slightly duller, grayer brown on breast, head, and dorsal surface. Males in first adult dress have the white tips on the outer rectrices broad, as in the South American races and *T. c. extimus* of Cerro Pirre, but differ in darker shoulder.

Ridgway (U.S. Nat. Mus. Bull. 50, pt. 5, 1911, p. 776) gives colors of the male, recorded personally in Costa Rica as "bill yellow; naked eyelids brown; iris dark brown." The slightly thickened edge of the eyelid in this trogon is black.

A female taken March 4, 1965, at 2,650 meters on Volcán Barú, Chiriquí, had the iris dark brown; edge of eyelid dull black; maxilla down to nostril and tip black; side of maxilla and mandible yellowish green; tarsus and toes dull pale neutral gray; claws fuscous-black. Another female from Volcán Barú, taken March 7, 1965, had the iris warm brown, side of maxilla below nostril for two-thirds of length from base, and all of mandible slightly greenish yellow; rest of maxilla black; tarsus light mouse brown; toes somewhat darker; claws fuscous-brown.

Measurements.—Males (10 from Chiriquí), wing 121.0-127.0 (123.9), tail 132.6-136.6 (133.4), culmen from base 16.7-18.3 (17.7), tarsus 14.0-16.3 (15.2) mm.

Females (10 from Chiriquí), wing 120.0-126.8 (122.7), tail 131.3-139.6 (134.8), culmen from base 16.8-18.4 (17.5), tarsus 14.2-15.6 (14.8) mm.

Resident. Found in western Chiriquí around Volcán Barú, and from Cerro Pando westward throughout the Subtropical Zone, mainly from 1,200-2,000 meters; 1 record at 2,650 meters on Barú, 1 at 1,100 meters below Santa Clara, and 1 at 760 meters above Buena Vista. Blake (Fieldiana: Zool, vol. 36, no. 5, 1958, p. 523) recorded 1 in the Mönniche collection on the Caribbean slope from Camp Cilindro, Bocas del Toro, at 1,580 meters.

Of the records given by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, p. 492) only those for "Boquete (Bridges), Volcan de Chiriquí" are valid. Their listings for David, Castillo, and Santa Fé were included through error, as these are lowland localities where

this trogon would not be found. Their reports for Calovévora and Cordillera de Tolé refer to *Trogon aurantiiventris*. A record for Isla Gobernadora in the lower Golfo de Montijo, on the Pacific coast of Veraguas (Auk, 1950, p. 364), is based on a specimen with false locality forwarded by J. H. Batty to Lord Rothschild.

The bird is one of forests that may range in fairly open areas as well as in the denser sections. Usually I have found them in pairs. An ordinary call is *cow cow*, repeated steadily and rather slowly. Also they utter a plaintive double- or treble-noted whistle easily imitated, through which on several occasions I have decoyed the birds close to me. In tone this call suggests that of some of the antshrikes, tropical ovenbirds, or other small bush inhabitants, quite different from any other sound that I have heard from a bird of this family. On occasion I have had them fly to a perch above me with rattling wings, and peer down with curiosity as I moved about slowly in undergrowth.

Five nests recorded by Rowley (Proc. West. Found. Vert. Zool., Vol. 1, No. 3, 1966, p. 152, fig. 29) in the Sierra Madre del Sur, Oaxaca, each held 2 slightly glossy white eggs, with range in size $27.3\text{--}31.7 \times 22.9\text{--}23.5$ mm. An egg in the British Museum, from Irazú, Costa Rica, with date of May 18, 1900 (collector not given but handwriting on original label apparently that of C. F. Underwood) is dull white, without gloss, in form short subelliptical. It measures 27.7×21.9 mm.

As Gould, in his description of *puella* listed his specimen from "Escuintla, South America" some have considered the country as uncertain, since the name is found in México and elsewhere. There seems to be no reason to doubt that the bird came from Guatemala.

TROGON COLLARIS HEOTHINUS Wetmore

Trogon collaris heothinus Wetmore, Proc. Biol. Soc. Washington, vol. 80, December 1, 1967, p. 238. (North Fork of Río Pucro, Cerro Tacarcuna, 2000 meters elevation, Serranía del Darién, Darién, Panamá.)

Male similar to that of *T. c. puella*, but with white bars on tail broader, more prominent; female duller, more grayish olive-brown, on upper surface and breast.

A male, collected February 20, 1964, on Cerro Malí, Darién, had the iris dark brown; bill yellow, verging toward honey yellow; tarsus and toes light brownish gray; claws fuscous.

A female, taken February 27, in the same area, had the iris wood brown; side of maxilla from base below and back of nostril, forward halfway to the tip, extreme tip of maxilla, and all of mandible yellow-

ish green; rest of maxilla black; tarsus and toes pale brownish neutral gray; claws brownish neutral gray.

Measurements.—Males (3 from Cerro Malí and Cerro Tacarcuna, Darién), wing 121.3-122.4 (121.9), tail 137.4-139.8 (138.4), culmen from base 17.9-18.2 (18.0), tarsus 14.2-15.1 (14.7) mm.

Female (1 from Cerro Malí, Darién), wing 121.0, tail 140.0, culmen from base 18.7, tarsus 14.4 mm.

Resident. Fairly common across the higher slopes of Cerro Malí and Cerro Tacarcuna (1,400-1,460 meters elevation).

As a race of the wide-ranging collared trogon had been described from Cerro Pirre in eastern Darién it was no surprise to encounter this species in the higher levels of the eastern end of the Serranía del Darién. It was wholly unexpected, however, to find that the affinities of this population seem closer to the birds of western Panamá and Central America, rather than to those of the mountains of nearby Colombia.

The males of the Tacarcuna race, all apparently adult, have the terminal white tip on the outer rectrices slightly broader than in the western subspecies *puella*, and so appear somewhat intermediate toward *Trogon c. virginalis* of western Colombia to the south. The female is definitely duller, more olive brown.

In habits and calls these eastern Darién birds resemble those with which I had been familiar in Chiriquí. Stomachs of those collected were filled with remains of drupes, with addition in one of fragments of a large beetle, and in another of an orthopteran.

A nest was located in a shallow hole, about 2 meters above the ground in a stub that stood in the forest. The 2 eggs, partly incubated, collected February 28, 1964, that rested on the decaying wood in the bottom of the cavity, are white, with a smooth surface and slight gloss. One is between subelliptical and oval, the other more nearly short oval. They measure 28.8×22.1 and 28.5×23.0 mm.

TROGON COLLARIS EXTIMUS Griscom

Trogon collaris extimus Griscom, Bull. Mus. Comp. Zool., vol. 69, no. 8, April 1929, p. 162. (Cana, Cerro Pirre, Darién.)

Characters.—Definitely smaller than the other races found in Panamá and *T. c. virginalis* of western Colombia; male with the terminal white on the three outer rectrices broad, as in *virginalis* and the other South American races.

Measurements.—Males (5 from Cerro Pirre), wing 108.0-118.0

(113.1), tail 112.0-124.5 (117.3), culmen from base 17.6-18.2 (18.0), tarsus 13.7-15.5 (14.3) mm.

Females (4 from Cerro Pirre), wing 110.0-115.7 (113.6), tail 117.8-126.7 (121.9), culmen from base 16.4-17.8 (17.0), tarsus 13.5-14.7 (14.0) mm.

Resident. Found locally in the higher elevations on Cerro Pirre, Darién.

The type series collected by R. R. Benson for the Museum of Comparative Zoology, included 1 male and 2 females. Earlier Goldman between April and June 1912 had taken 3 males and 2 females at Cana and nearby. The latest record is a male in the Gorgas Memorial Laboratory secured near Cana on August 9, 1965, by Dr. Pedro Galindo.

TROGON AURANTIIVENTRIS AURANTIIVENTRIS Gould:
Orange-bellied Trogon, Trogón Anaranjado

Trogon aurantiiventris Gould, Proc. Zool. Soc. London, pt. 24, August 13, 1856, p. 107. ("Near David" = Boquete, Chiriquí.)

Trogon aurantiiventris flavidior Griscom, Amer. Mus. Nov., no. 141, October 31, 1924, p. 1. (Cerro Flores, 1,200 meters, eastern Chiriquí.)

A small trogon, in size, pattern of markings, and color like *Trogon collaris puella*, the collared trogon of western Panamá, except that the lower breast and abdomen are orange-yellow to orange instead of red.

Description.—Length 240-270 mm. Lower half of tarsus bare. Adult male, upper surface, including lesser wing coverts, metallic green to golden green; central rectrices usually darker, two adjacent pairs similar on the outer webs, with the inner webs black, all three pairs tipped with black; three outer pairs black, tipped and barred rather narrowly with white; wings black, with the longer primaries edged narrowly with white; outer webs of secondaries, greater and middle coverts barred narrowly and irregularly with white; forehead, side of head, and throat black; lower foreneck and upper breast metallic green like the back, the feathers black basally; a distinct band of white across the chest; sides gray; rest of under surface orange to orange-yellow; tibia and feathering of upper half of tarsus black; under surface of primaries at base white; under wing coverts slate-black, barred lightly with gray.

Adult female, upper surface, including the lesser wing coverts, brown, darker on crown, more tawny on rump and upper tail coverts; central rectrices chestnut, two adjacent pairs similar on outer webs,

brownish black on inner webs, all three tipped with black; three outer pairs black basally changing to pale dull brown, with outer webs distally white mottled lightly with dusky, all with a grayish brown subterminal bar, and a broad tip of white; primaries and their coverts dull, somewhat brownish black, the longer feathers edged with white; outer webs of secondaries, greater and middle coverts light brown, paler than back, finely lined and dotted with black; a narrow white eye-ring; sides of head somewhat indistinctly slaty black; foreneck and upper breast brown, like back; a distinct breast band of white; rest of lower surface slightly orange-yellow to orange, duller than in the male; tibia and feathers of upper half of tarsus somewhat brownish black.

An adult male collected March 7, 1965, near the Río Chiriquí Viejo, west of El Volcán, Chiriquí, had the iris warm brown; edge of eyelid dull black; bill yellow; tarsi and toes dull light olive-green; claws fuscous-brown.

Measurements.—Males (17 from Cerro Campana, Veraguas and Chiriquí), wing 118.1-128.8 (123.3), tail 126.1-136.4 (130.9), culmen from base 16.0-18.8 (17.4), tarsus 13.2-15.8 (14.9) mm.

Females (14 from Cerro Campana, Veraguas and Chiriquí), wing 118.0-125.6 (121.8), tail 129.0-137.8 (132.9), culmen from base 15.2-17.8 (16.5), tarsus 13.5-15.7 (14.8) mm.

Resident. Recorded in forested areas from Cerro Campana, western Province of Panamá, and the middle mountain slopes of Veraguas and Chiriquí, ranging across the divide beyond Boquete to the Caribbean slope in Bocas del Toro.

In March 1951, we found this trogon fairly common on the southern face of Cerro Campana, between 850 and 975 meters elevation. Here they ranged in the rather open forest, and also in large second growth, mainly in areas protected from the strong winds that come regularly across the high mountain slopes. Females taken during March showed development of the ovaries, 1 specimen taken on March 3 having worn tips on the tail as though abraded from a nest cavity. Males uttered a whistled call like that of the collared trogon. One female scolded me with a rapidly uttered, chattering note like that of a barred antshrike. Near El Volcán I secured 1 female at 1,750 meters on Cerro Pando, and a male in a tract of forest beside the Río Chiriquí Viejo at 1,280 meters.

Trogon aurantiiventris, described by Gould in 1856 from a specimen collected by Thomas Bridges, was listed incorrectly as from "near

David, Veragua," as trogons of this group are not found in the lowlands. P. L. Sclater (Proc. Zool. Soc. London, 1856, pp. 138-143) wrote that "Mr. Bridges arrived at David in the month of January in the present year and stayed there until the middle of the following March." According to Sclater's account Bridges' collections were made "near the town on the banks of the river, or between that and the Boqueti—an elevated savannah of about 4,000 feet above the sea level" on the volcano. It is appropriate from this to list the type locality as Boquete, as the bird is found in that area.

Specimens in the British Museum collected by Arcé come from Calovévora and Santa Fé, in Veraguas, and the Cordillera de Tolé and the southern slope of the volcano in Chiriquí. Salvin's record for Castillo (Proc. Zool. Soc. London, 1870, p. 202) is questionable as this is a lowland area. Records from specimens sent by J. H. Batty to Rothschild (Auk, 1950, p. 364) labeled from islands off the coast of Chiriquí and Veraguas are erroneous for this bird of the inland mountains. West of Tolé this trogon was secured by Griscom on Cerro Flores, inland from Remedios, and by Mrs. Davidson at Chame on this same ridge. Many have come from the Boquete area on the volcano, including specimens in the Mönniche collection (Blake, Fieldiana: Zool., vol. 36, no. 5, 1958, p. 523) from Camp Cilindro and Camp Holcomb on the Caribbean slope in Bocas del Toro. On the western side of the volcano they are less common, as I have found only 2, a female on Cerro Pando, and a male on the Río Chiriquí Viejo at Palo Santo, beyond El Volcán.

Blake (Condor, 1956, p. 387) described a nest in the Mönniche collection, from the Finca Lérida taken July 2, 1932, located 2 meters from the ground in a large tree in a cavity "caused by the rotting of a branch" with the single egg resting on "rotten wood of the cavity's floor." The egg, white, slightly glossy, measured 26.9×22.5 mm.

The orange-yellow of the breast and abdomen of this trogon is as unstable a color as that of *Trogon violaceus* since it fades appreciably even when protected in light-proof museum cases. The hundred year old skins in the British Museum and in the National Museum have lost much of this color, as have those taken in 1901 by W. W. Brown, Jr., and those collected by Benson in 1931. Griscom named a race from Cerro Flores in eastern Chiriquí on the basis of yellower color of the under surface, but this is covered by variation in those of farther west in the Republic in the series now available. Birds that I collected on Cerro Campana average more orange than some

of those from western Chiriquí, but this I regard as individual variation.

Beyond Chiriquí the typical form of the orange-bellied trogon ranges to central Costa Rica. Birds from the northern part of that country have the color of the posterior under surface much redder orange, so that they have been described by Bangs as a separate race, *T. a. underwoodi*.

The relationship of these yellow-to-orange birds to *Trogon col-laris puella*, with which they are sympatric in part at least of their range, is uncertain. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, p. 493) wrote that "we have little doubt that it is only an aberrant form of *T. puella*," and so listed it in their account. Ogilvie Grant (Cat. Birds Brit. Mus., vol. 17, 1892, p. 455) included *aurantiiventris* as distinct in his review of the kinds of trogons, but added that "It is very doubtful if this species is really distinct from *T. puella* or merely a colour-variety." Bangs (Proc. New England Zool. Club, vol. 3, 1902, p. 32), in his description of collections made at Boquete by W. W. Brown, Jr., wrote regarding this matter that "Mr. Brown had splendid opportunities of observing the birds in life and is convinced that they are distinct species; he told me that whenever he saw a pair together, always it was two red-bellied or two yellow-bellied birds" and never a mixed pair. The close similarity of the two is especially evident with older, faded museum specimens. The question of relationship is one that needs careful, detailed studies of the birds in life. In view of the uncertainty from present information the *aurantiiventris* group is treated here as a distinct species.

TROGON RUFUS TENELLUS Cabanis: Graceful Trogon,
Trogón Gracioso

Trogon tenellus Cabanis, Journ. f. Orn., vol. 10, May 1862, p. 173. (Costa Rica.)

Size small; breast and abdomen yellow; edge of eyelids blue; outer tail feathers white, heavily barred with black; males with breast metallic green; female with breast brown, and central tail feathers cinnamon.

Description.—Length 235-260 mm. Tarsus feathered for upper half, lower end bare. Adult male, crown, back, lesser wing coverts, and rump metallic green; upper tail coverts usually somewhat bluish green; central rectrices bluish green to greenish blue, tipped broadly with black; two adjacent pairs with outer web similar, inner web black; three outer pairs black, tipped broadly with white, with the

inner webs at the end and the outer web barred broadly with white; primaries, primary coverts and inner webs of secondaries black, with the longer primaries edged with white; outer webs of secondaries, greater and middle wing coverts black, finely vermiculated and barred with white; forehead, side of head, and throat black; breast metallic green, in some bronze or golden green, with the concealed subterminal area black; rest of under surface yellow to orange-yellow (subject to fading); the feathers basally pure white, this showing as a white band across the center of the breast, adjacent to the green; some of the lateral yellow feathers adjacent to the green basally black; under surface of primaries and secondaries pale yellowish white at base; under wing coverts gray, the outer feathers banded lightly with white and black; tibia dull black.

Adult female, upper surface, except wings, brown, usually darker on the crown, lighter on the rump and upper tail coverts; central rectrices rufous-brown to chestnut, with an indistinct subterminal band of cinnamon-buff, and a narrow terminal one of black; next two pairs adjacent black, with outer and inner webs edged with rufous-brown to chestnut; three outer pairs black, tipped and barred heavily with white; primaries and inner webs of secondaries fuscous-black, the outer webs of the primaries edged narrowly with white; outer webs of secondaries, and greater and middle coverts pale brown, finely vermiculated with dusky; lesser wing coverts black, tipped with brown; orbital ring white, with an edging of black in front and back; rest of side of head like pileum; throat and breast brown, usually paler than back; rest of under surface light orange-yellow (subject to fading); a white breast band as in male; tibia dull black; a femoral tuft of pale yellow.

Immature male, breast more or less brown mixed with green; central tail feathers with a broad tip, and a distal edging of cinnamon on the outer web.

A male, collected February 17, 1961, near the Peluca Hydrographic Station, on the Río Boquerón, Panamá, had the iris dark brown; thickened eyelids, forming a ring entirely around eye, light blue; culmen and distal half of maxilla yellow; basal half and mandible yellowish green; tarsus and toes bluish gray. Another male, taken February 9, 1962, at El Llano, Panamá, was similar, but with the bare skin of the center of the lower eyelid pale pink; bill light green, becoming yellow on the line of the culmen and the tip of the maxilla; tarsus, toes, and claws neutral gray; inside of mouth light neutral gray. A third male, March 12, 1966, from

Puerto Armuelles, Chiriquí, had the iris dark reddish brown; thickened edge of eyelid and bare skin above eye grayish blue; maxilla and tip of mandible light greenish yellow; rest of mandible darker grayish yellow-green.

A female, taken February 15, 1959, at Boca de Paya, Darién, had the iris dark brown; base of maxilla and mandible light green; rest of mandible dull black; thickened edge of eyelid light blue; tarsus and toes neutral gray, claws dark neutral gray, all except the fourth tipped with light brownish white. Another collected February 8, 1962, at Cañita, Panamá, had the thickened eyelid grayish blue; culmen and maxilla to the nostril dull black; rest of bill green, tinged with yellow on tip of mandible and cutting edge.

Measurements.—Males (18 from Panamá), wing 102.9-113.5 (108.9), tail 123.8-134.9 (129.0), culmen from base 16.4-18.7 (17.6), tarsus 13.2-14.7 (13.8) mm.

Females (15 from Panamá), wing 104.0-114.8 (110.1), tail 126.7-137.8 (131.6), culmen from base 16.3-18.5 (17.3), tarsus 13.1-14.4 (13.5) mm.

Resident. Fairly common in forested areas in the tropical lowlands throughout the Republic. Found to 750 meters on the Río Changuena, Bocas del Toro, to 850 meters on Cerro Campana, and to 600 meters on Cerro Bruja and Cerro Pirre. In Darién it has been found on Cerro Sapo, at Boca de Paya, and on Cerro Pirre, but I did not record it on the Río Jaqué.

This is one of the more common trogons, found like others of its family only in forest, but frequently in areas where such cover is restricted. Though they often perch below the tree crown, they may be overlooked, as unless they are feeding or calling they rest quietly. The usual call is a four-noted whistle, given very slowly with a pause before repetition. Scolding calls heard occasionally resemble those of related species.

Graceful trogons come regularly to fruiting trees in the forest, especially to figs. Dr. Frank M. Chapman (Tropical Air Castle, 1929, p. 403), on Barro Colorado Island, found them feeding on the berries of mangabé (*Didimopanax morototoni*). Such food is seized quickly on the wing. One shot on Cerro Pirre had remains of caterpillars, locustids, a larval neuropteran, and a few seeds in the stomach. I have seen them among other birds watching for larger insects flushed by a moving ant swarm.

On Barro Colorado Island their nests (with 2 eggs) have been found in April and June. Skutch (Ibis, 1966, p. 8) mentions the

nest as one that "is open and exposed." On March 10, 1961, I collected a set of 2 near the Candelaria Hydrographic Station on the Rio Pequení, Panamá. The site was an old woodpecker hole 4 meters from the ground in a dead stub that stood in fairly open woodland, on the summit of a steep-sided hill. Since most of the front wall of the cavity had broken away the eggs were clearly visible as they rested on the bed of bits of wood, soft from decay, in the bottom. When the nest was found the male was incubating. When I came to photograph and collect the set the following day the female covered the 2 eggs. These were slightly incubated. They are very faintly creamy white, in shape between subelliptical and oval, with measurements of 28.8×22.3 and 29.5×22.8 mm. A single egg in the British Museum collection, taken February 24, 1898, at Pozo Azul de Pirris, Costa Rica, is white, with slight gloss, elliptical in form, with measurements of 28.1×22.6 mm.

The race *tenellus* is found from southeastern Honduras through Nicaragua, Costa Rica, and Panamá to northern Chocó (Unguía, Acandí) in northwestern Colombia. The male of the form of western Colombia, *T. r. virginalis*, has the central rectrices green. The species ranges widely through northern South America.

TROGON VIOLACEUS CONCINNUS Lawrence: Gartered Trogon,
Trogón Violáceo

Trogon concinnus, Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1862, p. 463. (Atlantic Side, Line of the Panama Railway, Canal Zone, Panamá.)

Size small; lower breast and abdomen orange-yellow; rim of eyelids yellow; outer tail feathers black, heavily barred with white; male with upper breast blue; female with breast and central tail feathers dark gray.

Description.—Length 220-245 mm. Tarsus feathered to base of toes. Adult male, head and upper foreneck black; with base of hindneck violet-blue, in some a faint wash of this color over the upper hindneck and the posterior surface of the crown; back and lesser wing coverts metallic green to yellowish green; rump and upper tail coverts usually bluish green; central rectrices bluish green to blue, tipped with black, often with an indistinct hint of narrow bluish bars; two adjacent pairs black with outer webs edged with bluish green; three outer pairs black, tipped broadly with white, barred heavily on the outer webs, and to a varying extent on the inner webs, with white; outer web of secondaries, and greater and middle coverts finely vermiculated with black and white; primaries and

primary coverts black, with the outer primaries edged narrowly with white; lower foreneck and upper breast metallic blue to violet-blue, bordered posteriorly by a narrow band of black, in which some of the lower feathers are tipped lightly with yellow; rest of lower surface and lateral tufts on either side of rump orange-yellow; under wing coverts slate-black edged with grayish white or gray; proximal base of primaries and secondaries white; tibia black.

Adult female, above, including the lesser wing coverts, side of head and upper breast slate color, blacker on the crown; three central pairs of rectrices slate, tipped with black; three outer pairs black, tipped and barred on the outer web broadly with white; a white spot immediately before and behind eye; wings black, the longer primaries edged narrowly with white; outer webs of secondaries and greater and middle coverts black, barred very narrowly with white; sides somewhat brownish gray; rest of lower surface and lateral tufts on side of rump orange-yellow, usually slightly paler than in the male, with an indefinite white bar where the yellow meets the slate of the breast; underside of base of primaries and secondaries white; under wing coverts slate gray; tibia black.

Immature male, for a period while attaining adult plumage, may show slate feathers mixed with the blue on the lower breast.

The orange-yellow of the under surface in both sexes fades as specimens age, even in closed museum cabinets, those in the National Museum collection secured in Panamá by W. W. Brown, Jr., in 1900, and by E. A. Goldman in 1911, being much paler than those that I have collected between 1950 and 1964. Two in my series dated 1946 and 1949 are now (1966) appreciably lighter than the others. In some males, especially in immature individuals, the lower breast changes to grayish blue.

An adult male, collected February 17, 1961, near the Peluca Hydrographic Station on the Río Boquerón, had the iris dark brown; thickened rim of the bare eyelids honey yellow; bill pale greenish gray; toes dark neutral gray; claws dusky neutral gray. Another male, February 5, 1962, from El Llano, Panamá, had the iris warm brown; rim of eyelids bright yellow; bill pale neutral gray; toes dull neutral gray; claws black.

Measurements.—Males (23 from Panamá), wing 108.2-117.8 (113.0), tail 112.0-124.0 (117.7), culmen from base 16.0-18.4 (17.2), tarsus 12.8-14.0 (13.4) mm.

Females (11 from Panamá), wing 110.7-116.7 (113.7), tail 113.0-

119.0 (117.7), culmen from base 16.4-17.6 (16.9), tarsus 13.0-13.9 (13.6) mm.

Resident. Fairly common in more open forested areas throughout the tropical lowlands on both Pacific and Atlantic slopes. To 1,200 meters near Santa Clara, and 1,280 meters near the base of Cerro Pando, in Chiriquí; to 600 meters on Cerro Azul, Province of Panamá.

Salvin (Proc. Zool. Soc. London, 1867, p. 151) cites this species in collections made by Arcé near Santa Fé, Veraguas, the only report to date from that area. The specimen, a male, now in the British Museum has Arcé's original label attached so that the record seems valid. Specimens recorded by Bangs and Barbour (Bull. Mus. Comp. Zool., vol. 65, 1922, p. 203) from Cerro Sapo, Darién, are from near 450 meters elevation. The species ranges on the headwaters of the Río Tacarcuna in eastern Darién to 575 meters.

While in general the gartered trogon has the same broad geographical distribution as the graceful trogon (*Trogon rufus tenellus*), the latter species is an inhabitant of the denser forests, while the present bird ranges in the trees along streams, at the forest edge, the borders of clearings, and similar more open cover. In early morning I have seen them resting in the sun in the open tops of guarumos. They are found regularly in pairs. The yellow eyelid of the male shows clearly in life, an excellent mark for field identification.

The usual call is a repetition of a single note, repeated steadily, with increasing rapidity toward the end, in sound like the Masséna and long-tailed trogons, but less loud, and higher in pitch. It, thus, is quite different from the whistled notes of the graceful trogon of similar size.

The nest may be in a cavity in a decaying tree stump, or may be excavated in a termite nest. Near Almirante one pair had made an opening in the upper end of a huge wasp's nest 20 meters from the ground in an open-limbed tree. As I watched the birds the male clung at the entrance, undisturbed by the wasps, while the female rested quietly on a branch a few meters away. Skutch (Auk, 1956, p. 357) has found the closely related bird of Costa Rica using similar situations. Near Chepo, on April 10, 1949, a pair had cut a hole in a termitarium located 10 meters from the ground in a tree standing in open forest. An egg in the British Museum from Cachí, Costa Rica, of the intermediate population between *concinus* and the slightly larger subspecies *braccatus*, in color dull white, with faint gloss, in form oval, measures 29.2×22.6 mm.

One shot at El Llano had a large orthopteran in the stomach. One

from Portobelo had eaten 2 large caterpillars, a large ant, 2 earwigs, and several berries.

The race *concinus* was named by Lawrence from specimens sent to him by James McLeannan. In part 1 of the account of the McLeannan collection, Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 7, 1861, p. 290) under the family Trogonidae listed 5 species by name only, without comment, one of these being "no. 21 *Trogon caligatus* Gould." In the introductory statement Lawrence wrote that the "birds comprised in this catalogue were collected by James McLeannan, Esq., on the Atlantic side of the Isthmus of Panama along the line of the Panama Railroad from near the coast to about a central point between the two oceans." In the description of *concinus* as new in part 3 of his account of this material Lawrence (idem, vol. 7, 1862, p. 463) does not give the locality for his type but says of it "I am not able to make this agree with any of the described species of the genus. It comes nearest to *T. caligatus*." It may be assumed that the type is the bird listed under the latter name in part 1, and that the type locality is as designated above. North of South America the species *violaceus* ranges through Central America into México. Separation of two races in this area is based on differences in size, the northern birds being larger. While Costa Rican birds have been included in the range of the southern race *concinus* Zimmer (Amer. Mus. Nov., no. 1380, 1948, p. 36) noted that the population of that country is nearer the northern form *braccatus*. The considerable series of the species in the National Museum supports that conclusion, as shown by the following series of measurements:

Males of *Trogon violaceus braccatus* (15 from México, Guatemala, Honduras, and Nicaragua), wing 119.0-125.5 (122.4), tail 120.0-130.0 (125.7), culmen from base 16.2-18.7 (16.9), tarsus 13.2-14.8 (13.9) mm.

In our series from Costa Rica 10 males measure as follows: wing 114.0-122.2 (120.4), tail 116.0-124.0 (120.4), culmen from base 16.5-18.4 (17.0), tarsus 13.2-14.6 (14.0) mm. These dimensions show that while wing and tail average slightly less than *braccatus* they are nearer the northern group than to *concinus* found in Panamá.

On the basis of a male collected by von Wedel at Permé, eastern San Blas, on March 27, 1930, Griscom (Bull. Mus. Comp. Zool., vol. 72, 1932, p. 338) has recorded *Trogon violaceus caligatus*, a subspecies that ranges through the tropical lowlands of northern Colombia and northwestern Venezuela, as an additional race from

Panamá. The northern populations of this trogon from México through Panamá agree in having the crown and usually the nape black, though occasional individuals have the feathers of the back of the head tipped with blue. The birds of Colombia and Venezuela normally have the nape and the back of the pileum dark blue, with this color extending forward to the level of the center of the eyes. Rarely one from this area lacks this blue coloration or has it somewhat reduced. Some that I have collected in the eastern Province of Panamá (Chimán), eastern Darién (Jaqué), and San Blas (Mandinga) appear slightly intermediate as they show the bluish tipping on the posterior part of the crown (behind the eyes) and the nape described above. The bird from Permé, examined through the courtesy of Dr. Raymond Paynter, Jr., is of this intermediate group.

We have typical examples of *caligatus* from Nazaret and Tierra Alta, on the lower Río Sinú in the Department of Córdoba (formerly a part of Bolívar) in northwestern Colombia. De Schauensee (Caldasia, vol. 5, no. 23, 1949, p. 595) included *concinus* tentatively from the Tropical Zone of the Pacific coast of that country, and later (Birds Colombia, 1964, p. 165) listed it definitely from that area. It seems probable that complete intergradation between the two forms takes place in northwestern Colombia. On present information the single intermediate specimen from Permé does not justify the inclusion of *T. v. caligatus* in the list of forms of Panamá.

Order CORACIIFORMES

Family ALCEDINIDAE: Kingfishers; Martín Pescadores

Kingfishers are distributed through the temperate and tropical regions of the world, absent only on some of the more isolated oceanic islands. A majority of the more than 85 living species belong in the subfamily Daceloninae, the forest kingfishers, not found in the Americas but widely distributed elsewhere. While some of these range in swampy areas, others live in forests or open lands away from streams or other bodies of water.

The six distinct kinds of the family found in the New World, all represented in Panamá, are dependent on water, either in streams or swamps where they live mainly on fish captured by diving, with the addition of crabs and other crustaceans. Most nest in burrows dug in earthen banks, in termite nests, or in the trunks or limbs of trees. No nesting material is used for the eggs which are white, or faintly buff. The young are entirely naked when hatched. Some of the Old World species are quite brightly colored in contrast to the plainer markings of those that range in the Americas.

KEY TO THE SPECIES OF ALCEDINIDAE

1. Upper surface of body mainly gray 2
 Upper surface dark green to greenish black 3
2. Large; wing more than 180 mm., culmen from base more than 75 mm., lower breast rufous-brown.
 Ringed kingfisher, *Ceryle torquata torquata*, p. 421
 Smaller; wing less than 170 mm., culmen from base less than 65 mm., lower breast white centrally.
 Belted kingfisher, *Ceryle alcyon*, p. 424
3. Throat white, or pale buffy white; sides and under wing coverts white, or white spotted or lined with greenish black. 4
 Throat, foreneck, and sides rufous to chestnut 5
4. Larger; wing 130 mm. or more, culmen from base more than 65 mm.
 Amazon kingfisher, *Chloroceryle amazona mexicana*, p. 425
 Smaller; wing less than 90 mm., culmen from base less than 55 mm.
 Green kingfisher, *Chloroceryle americana isthmica*, p. 428
5. Larger; wing 90 mm. or more; entire under surface rufous to chestnut.
 Green-and-rufous kingfisher, *Chloroceryle inda chocoensis*, p. 432
 Small; wing less than 65 mm., center of breast and under tail coverts white.
 Pygmy kingfisher, *Chloroceryle aenea*, p. 435

**CERYLE TORQUATA TORQUATA (Linnaeus): Ringed Kingfisher,
Martín Pescador Grande**

FIGURE 49

Alcedo torquata Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 180. (México.)

Size large; breast wholly rufous-brown in both sexes.

Description.—Length 375-425 mm. Adult male, upper surface, including the greater, middle, and lesser wing coverts, bluish gray, with shaft lines of black, especially prominent on the head; a prominent white band across hindneck; primaries black tipped lightly with white; primary coverts black edged narrowly with bluish gray; secondaries black tipped with white, with the outer webs edged widely with bluish gray; rectrices tipped with white, the central pair bluish gray with a broad shaft line of black, others black with the outer web edged with bluish gray, all spotted and barred irregularly with white; lores and a circlet around eye dull black, the feathers tipped indistinctly with dark gray; a white spot above the lores, and another on the lower eyelid; throat, upper foreneck, and posterior malar region white, this confluent with the white collar of the hindneck; lower foreneck, breast, sides, and upper abdomen cinnamon-rufous; under wing coverts, much of under surface of wing, lower abdomen, and under tail coverts white; axillars white barred more or less with slate; under tail coverts varying from plain white to lightly spotted, or to rather prominently barred with slate-gray; flanks bluish slate, barred with white.

Adult female, like male but with a broad band of bluish gray across lower foreneck, bordered narrowly with white across upper breast; sides, axillars, under wing coverts, flanks, lower abdomen, and under tail coverts cinnamon-rufous like lower breast and abdomen.

Immature male, like adult female, but paler cinnamon-rufous below; breast band mixed dull gray and cinnamon, with black shaft lines; white pectoral band indistinct; under wing coverts wholly or partly white; black shaft streaks on crown and crest broader; wing coverts with slight to prominent black shaft lines.

Immature female, like immature male, but with under wing coverts cinnamon; white pectoral band usually prominent.

Iris brown; bill dull black, more or less brownish basally, with tip grayish white, and base of gonys indistinctly dull yellowish brown; tarsus and toes dull olive-brown; claws black.

Measurements.—Males (10 from Panamá and Colombia), wing

182-198 (191.8), tail 113.1-125.4 (120.2), culmen from base 77.1-86.1 (81.5), tarsus 15.7-17.6 (16.4) mm.

Females (10 from Nicaragua, Panamá, and Colombia), wing 188-199 (193.8), tail 118.0-125.7 (122.1), culmen from base 80.0-90.8 (85.0), tarsus 16.0-16.8 (16.4) mm.

Resident. Widely distributed, and fairly common throughout in the lowlands; less frequent in Chiriquí to 1,280 meters on the lakes, and along the Río Chiriquí Viejo, near El Volcán. Isla Coiba; Isla Escudo de Veraguas; Archipiélago de las Perlas (islas San José, del Rey, Chaperá, Cañas).

This kingfisher in the main is found along the larger rivers, though it wanders casually elsewhere in the lowlands wherever there is water. Occasionally it is found along the coast mainly near the mouths of streams, or around rocky headlands, though in coastal areas it is more frequent in the wider open channels of the mangrove swamps. It is common to see single birds flying high in the air across the land from one suitable haunt to another, when they come to attention often through their repetition of a single harsh note *check* or *chuck*.

Any northerner familiar with the belted kingfisher will recognize this larger species at once from its stocky form, general pattern of markings, crested head, and its similar rattling call, which, however, is uttered more slowly. The ringed kingfisher feeds on fish, occasionally also on small crabs. Because of its robust size and wariness it seems to have few enemies. Though once, in a journey by piragua up the Río Pucro in Darién, as one of these birds flew repeatedly ahead from one lookout perch to another, when it came to rest at the water's edge below a steep wooded slope, as it watched my slowly approaching canoe warily, a barred hawk-eagle dropped down quietly from the tree cover above and seized it.

The birds when perched rest quietly, occasionally jerking the tail and erecting the crest. The flight is direct, not undulating, but as they move forward the birds tend to veer slightly from side to side of a direct line. In mating display they fly in a great circle high in air, with the body tilted up at a slight angle, while they call with rattling notes. Occasionally, when two or three join in such flights one may carry a small fish. They nest in holes 2 meters or so in length that they dig in steep-sided banks along streams. In these modern times they also may range inland to the earthen walls on grades cut by bulldozers in road construction, though these may be distant from the larger water channels of the normal habitat of

these birds. Usually in these cases there is some small quebrada at the base of the slopes nearby. As indication of nesting dates, near Jaqué, Darién, on March 18, 1946, a pair scolded me with rattling calls when our piragua passed close by their nest hole in the river bank. The following year I found them paired higher up the Río Jaqué during the first 3 weeks in April. Near Soná, Veraguas, on May 19 and 21, 1953, I found 1 investigating a cut bank on the highway a considerable distance from any large stream. The journal of Major General G. Ralph Meyer on June 15, 1941, records that



FIGURE 49.—Ringed kingfisher, martín pescador grande, *Ceryle torquata torquata*.

he flushed 1 from a burrow dug on the north face of the bluff at Diablo Heights, Canal Zone, the entrance being elevated about 3 meters from the base. He noted a double furrow in the floor of the excavation "made presumably by the birds' feet when entering and leaving, much like that of the belted Kingfisher."

From 3 to 5 eggs are reported to constitute a set. Those of a set of 4 in the British Museum (Natural History), from Bartica, Guyana, collected August 25, 1925, by C. G. Young, are glossy white, and in form are slightly blunt oval. They measure as follows: 43.5×33.7 , 43.7×33.1 , 44.6×32.8 , 45.0×33.8 mm.

In Costa Rica, Skutch (Condor, 1957, pp. 221-222) found that both sexes shared in incubation, with a single daily changeover in early morning. Under this arrangement each parent in turn occupied

the nest for a period of 24 hours. At the shift in duty the incoming bird entered the tunnel while its mate still occupied the nest. He recorded the period when the young remained in nest after hatching as "35 days or more."

The nominate form of the ringed kingfisher, with type locality in México, ranges widely through Central America and in South America from the northern coasts south, west of the Andes, to Perú (Department of Lima), and on the east to central Argentina (La Pampa, Buenos Aires) and southern Uruguay. In this vast area there is no appreciable variation in color or size.

The distinct subspecies *C. t. stellata* (Meyen), marked by shorter bill, somewhat duller gray color above, with the secondaries prominently barred with white, and in the adult male by slate-gray barring on the under tail coverts, breeds in southern Chile, where it is found from Concepción (casually to Colchagua) to Tierra del Fuego, and in Argentina from Río Negro to Tierra del Fuego. As a winter migrant it comes north to La Pampa and Buenos Aires.

**CERYLE ALCYON (Linnaeus): Belted Kingfisher,
Martín Pescador Pasajero**

Alcedo alcyon Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 115. (South Carolina.)

Of medium size, gray above and on band across chest; abdomen white.

Description.—Length 290-320 mm. Adult male, upper surface, side of head, broad breastband and sides bluish gray; primaries and inner webs of secondaries black, broadly white basally; outer web of outermost primary spotted, and secondaries tipped, with white; central rectrices like back, with a black shaft-line; outermost pair black, spotted, and barred with white; those lying between the central and outer pairs gray on the outer web, elsewhere black, also spotted and barred with white; lores black; a small white spot above the nostril, another in front of eye, and one on lower eyelid white; foreneck, band across hindneck, breast, abdomen, under tail coverts, axillars, and under wing coverts clear white.

Adult female, similar to male but with a band across lower breast, sides and axillars cinnamon-rufous; with no white band across hindneck.

Immature birds of both sexes with gray chest band more or less mixed with cinnamon.

Measurements.—Males (10 specimens), wing 154.0-164.0 (158.6),

tail 82.5-90.5 (87.1), culmen from base 55.0-61.5 (57.1), tarsus 11.0-12.0 (11.6) mm.

Females (10 specimens), wing 153.8-165.0 (159.4), tail 84.0-94.0 (89.7), culmen from base 51.0-61.0 (55.9), tarsus 10.0-13.2 (12.0) mm.

Migrant from the north. Found regularly, but in small number, mainly along both coasts, including the offshore islands; less frequently on the larger rivers and at inland lakes, except that they winter regularly on Gatun Lake and the lower Río Chagres.

Recorded from October 1 to April 2. In my experience they have been more common around the Laguna de Chiriquí than elsewhere. They range in lesser numbers than on the mainland to offshore islands, where I have recorded them at islas Parida, Canal de Afuera, Gobernadora, Cébacó, Taboga, Uravá, and San José. Charles O. Handley, Jr., caught 1 in a mist net set over the mouth of the lagoon on Isla Escudo de Veraguas.

This kingfisher is a winter visitor, often not recognized, found on the coasts, along the lower courses of rivers and around the larger lakes, where these have open shores. Usually they range alone and are silent and wary, so that I have taken only a few specimens of the several dozen that I have seen during the course of my work in the field. Around Isla Taboga I noted that they showed definite fear of another migratory fisherman from the north, the osprey. Not many seem to go far offshore as I did not record the species during the 5 weeks that I lived on Isla Coiba, and in the Archipiélago de las Perlas saw it only at Isla San José.

In the fifth edition of the *Check-list of North American Birds of the American Ornithologists' Union* (1957, p. 309) this species and the one following (*Ceryle torquata*) are listed under the generic name *Megaceryle*. From a careful comparison of the characters of these two with the type of *Ceryle*, recognition of a separate genus for them is not justified.

Phillips (Anal. Inst. Biol. Univ. Mex., vol. 33, 1962, pp. 336-338) in a survey of extensive series concludes that current division of this species in two geographic races on differences in size, and of form of the wing tip is not justified. With this I agree, as large and small birds are found at random throughout the extensive range.

CHLOROCERYLE AMAZONA MEXICANA Brodkorb, Amazon
Kingfisher, Martín Pescador Matraquero

Chloroceryle amazona mexicana Brodkorb, Auk, vol. 57, no. 4, October 2, 1940, p. 543. (Barra de Cahuacán, Chiapas, México.)

Of medium size; upper surface dark metallic bronze-green.

Description.—Length 275-300 mm. Adult male, above, including side of head, dark metallic bronze-green; hindneck with a broad band of white; outermost rectrices and inner webs of others, except central pair, spotted or barred with white, these markings concealed in the folded tail; scapulars with concealed markings of white; lower eyelid with a crescentic spot of white; some with a narrow white supraloral line of white of varying length, others without this mark; throat, foreneck, lower breast, abdomen, and under tail coverts white; a broad band on lower foreneck and upper breast cinnamon-rufous; a submalar line, and others on sides, dark metallic green; under wing coverts white; under surface of wing with broad markings of white.

Adult female, like male, but without rufous breastband; breast laterally broadly metallic green, often with the two sides joined by a narrow line of this color.

Immature, wing coverts with small spots of white; breast as in female, but lightly washed or spotted with cinnamon and buff.

Iris brown; bill black in adult, tinged with brown on lower surface of mandible at base in immature; tarsus and toes black.

Measurements.—Males (10 from Costa Rica, Panamá, and western Colombia), wing 130.5-136.2 (133.3), tail 74.7-79.7 (77.2), culmen from base 68.6-74.7 (71.2), tarsus 12.3-13.9 (13.4) mm.

Females (10 from Panamá), wing 132.0-138.8 (135.5), tail 77.2-84.2 (79.5), culmen from base 70.8-75.2 (73.5), tarsus 13.0-14.0 (13.5) mm.

Resident. Common along rivers in the lowlands throughout the Republic, ranging inland along open streams into the higher foothills in the mountains. Recorded in Darién at 575 meters on the Río Tacarcuna, and at 550 meters along the headwaters of the Río Setegantí, on Cerro Pirre.

These kingfishers are found along the open courses of rivers, commonly on their quieter channels, but also in the higher areas of swift current over stony beds where these are not closely overhung by forest. In stocky form they resemble the migrant belted kingfisher that comes during the period of northern winter, but are identified at a glance by the dark green color of the back, that at a distance may appear black. In flight they seem more graceful as they progress with a more sweeping movement. The usual note is a harsh *check* or *chet*, sometimes repeated rapidly so that it resembles a rattle. More rarely I have heard them utter series of

musical calls, loud but pleasing, that in tone and cadence have closely suggested the song of the northern water-thrush.

Breeding comes during the dry season when they are found in pairs. The normal site is in a cut bank along a river. A typical location is one that I found February 25, 1961, on the Río Boquerón, near the Peluca Hydrographic Station, a hole dug in the face of a clay bank, a meter and a half above a pool at the side of the river. The nest seemed to have held young at this date as I saw one parent carry a small fish to it. In mid-February 1955, near Las Lajas, in eastern Chiriquí, I found a female at a cut bank beside a road at a little distance from water.

The bill tip when fully grown is quite slender, with the point acute. During the breeding season, as the birds dig their nesting holes the end of the bill becomes worn away in both sexes until, while still pointed, it appears blunter and heavier.

In a detailed account of the life history Skutch (Condor, 1957, pp. 217-229) writes that in Costa Rica, while the birds are most common below an elevation of a thousand meters, they may be found higher, in suitable areas nearly to 1,750 meters. While nest holes were begun in January excavation proceeded slowly. When the bank was rocky some of the burrows remained intact through the rainy season so that they were used again the following year. Three nests on which he had records held 4 eggs or 4 nestlings. From his studies he reported that the pair shared in incubation, with several changes during the day, but with only the female on duty during the night. During relief the parent that had been away called near the nest hole, but did not enter until after the companion emerged. The incubation period was 22 days in one instance. The young were completely naked when hatched. The size of the fish brought as food in the first few days after hatching was very small, with increase in graduated scale as the nestlings grew. Since there is no removal of excrement from the nest, as the young grow the cavity is foul, particularly when the floor of the nest chamber becomes covered with scales and bones of the fish eaten and regurgitated after digestion. No harm to the young results, and usually as they grow the feathers remain fairly clean. The parents often bathe after a visit to the nest cavity.

A set of 3 eggs of this subspecies in the British Museum from the Salvin-Godman collection was taken by F. Blancaneaux in British Honduras, May 25, 1888. They are white, slightly buffy (perhaps from stain from the nest cavity), with the somewhat glossy

surface smooth, and the form subelliptical. They measure 31.1×26.3 , 31.6×25.6 and 32.5×25.2 mm.

Skutch (*loc. cit.*, p. 223) has noted that the young of kingfishers and motmots in hatching break the shell irregularly near the large end of the egg so that the cap when finally removed is asymmetrical, as it separates along an oblique line rather than on the usual transverse fracture. He found also that young kingfishers may take one to two days to emerge.

Countrymen in speaking of these birds sometimes refer to them as *martín del río*, or shorten the name to *martín*.

CHLOROCERYLE AMERICANA ISTHMICA (Goldman): Green Kingfisher, Martín Pescador Verde

FIGURE 50

Ceryle americana isthmica Goldman, Smithsonian Misc. Coll., vol. 56, no. 27, December 1, 1911, p. 1. (Río Indio, near Gatun, Canal Zone, Panamá.)

Small; dark above, white below on throat and abdomen; in flight, showing the white of lower surface and in tail.

Description.—Length 170-195 mm. Above, including side of head and a narrow submalar streak, dark metallic bronze-green, blacker on the forehead; a white collar across hindneck; scapular, interscapular, and rump feathers with concealed white at base; forehead and crown plain, or in some freckled with white; wing coverts plain, occasionally with small white spots; secondaries with three lines of narrow spots and the concealed bases white; usually some of the primaries with white spots on the outer web; central rectrices dull bluish black; outer pairs blackish spotted with white distally, and with the bases extensively white; malar region white, continuous with the collar on the hindneck; throat and upper foreneck buffy white; lower foreneck and breast deep rufous to chestnut-rufous; rest of under surface, including under wing coverts white, spotted more or less with greenish black; under tail coverts spotted in some, in others plain.

Adult female, like the male, but without rufous on the breast, this area with a somewhat broken band of greenish black; another less complete band of the same color across the lower breast; white of under surface usually washed with buff.

Young male, with rufous of chest band reduced in width, spotted and banded, in some extensively, with greenish black.

Iris dark brown; base of gonys and anterior third of lower margin

of mandibular rami dull grayish white; rest of bill black; tarsus and toes dusky neutral gray to slaty black; claws black.

Measurements.—Males (24 from Panamá), wing 77.8-82.7 (80.1), tail 53.6-58.2 (55.7), culmen from base 44.5-51.5 (48.3), tarsus 9.2-10.6 (9.9) mm.



FIGURE 50.—Green kingfisher, male, *martín pescador verde*, *Chloroceryle americana isthmica*.

Females (20 from Panamá), wing 80.0-85.7 (82.9), tail 53.7-61.7 (57.4), culmen from base 40.6-52.5 (47.9), tarsus 9.8-10.9 (10.3) mm.

Resident. Common on lowland streams throughout the Isthmus, in Chiriquí ranging in lesser numbers to 1,600 meters around Volcán Barú, in Los Santos to 425 meters on Cerro Hoya, and in Darién to 600 meters on Cerro Pirre and along the Serranía del Darién. Isla Coiba; Isla Parida; Isla Cébaco.

These small kingfishers, most common and most widely distributed of their family in Panamá, are found singly or in pairs along smaller streams and quebradas, often far inland along narrow channels where branches of the trees and lower growth join overhead. On the larger rivers they frequent the shoreline. They are found less commonly in mangrove swamps, and occasionally appear on rocky sea beaches where fresh water is near at hand. In early morning they may come out in the sun on snags or projecting points of boulders, but later in the day it is more usual for them to rest in shade. Their regular flights are low over the water, following the course of little streams, perhaps cutting across low-banked bends, but never crossing boldly high against the sky like their larger cousins. In their more shaded haunts only the flashing of the white base of the tail feathers and of the underparts as they turn allows the eye to follow them, since the dark upper surface of the body against the equally dark background renders them otherwise invisible.

When perched, at intervals the tail tip is twitched upward, and when near the top of this movement the neck is elongated and the head rises. The combination of these movements often is regular, and as amusing to the human eye as the operation of some mechanical toy.

Their chirping, chattering calls, low in tone, sometimes have seemed almost like those of some finch.

The nesting season extends from January to April. At Mandinga, San Blas, I noted a young bird recently from the nest, on January 31. And on the upper Río Jaqué, Darién, a Chocó man brought me a fledgling, not yet able to fly, on April 6. Laying females were collected at Boca de Paya, Darién, March 5, and on the Río Pacora, Panamá, on April 6. On the Río Chimán, on March 15, 1950, I saw one pair in an interesting display in which the male hovered back and forth to examine the face of the low earthen stream bank, while the female, perched on a snag over the water a few meters away, at intervals raised her pointed wings high above her back, while calling spiritedly.

Alexander Skutch (in Bent, U.S. Nat Mus. Bull. 176, 1940, pp. 142-143) describes the size of the opening of the nest burrow as "only 2 or 2½ inches in horizontal diameter," (equivalent to a little more than 5 to less than 6 centimeters). The burrow often is concealed beneath vegetation hanging from above, or partly hidden in some other manner. Male and female share the duties of incubation. No eggs of the race of this kingfisher found in Panamá

have been available, but they should be generally similar to those of the very slightly larger subspecies *Chloroceryle americana septentrionalis*, found from southern Texas to Guatemala. Eggs of a set of 5 of that race collected at Ciudad Victoria, Tamaulipas, in the A. C. Bent collection in the U. S. National Museum, are white with very faint gloss, and are subelliptical in shape. The range in size is $24.7-24.8 \times 19.0-19.7$ mm.

The green kingfisher dives regularly for small fishes, often disappearing completely beneath the surface of the water. Fish have been the only food that I have found in stomach examination.

As a species *Chloroceryle americana* ranges from southern Arizona and southern Texas south through Central America and South America to western Perú, Bolivia, central Argentina, Uruguay, and southern Brazil. Through this vast area there is clinal variation in size from large in the north to small in Brazil, and then slight increase again in the far southern area. These size differences, with slight variation in pattern of markings and color, have been the basis for recognition of several geographic races. The following summary outlines the three that concern the present account of the population of Panamá.

Chloroceryle americana septentrionalis (Sharpe)

Ceryle septentrionalis Sharpe, Cat. Birds Brit. Mus., vol. 17, 1892, p. 134.
(Teapa, Tabasco, México.)

Size large; white markings on wing and tail more extensive; female with dark breastband averaging narrower, with less black on sides of breast, this in some forming a secondary cross band; white of foreneck and breast only slightly marked with buff.

Measurements.—Males (24 specimens), wing 80.0-86.8 (82.6), tail 53.9-60.4 (57.1), culmen from base 44.3-52.5 (49.2), tarsus 9.2-11.0 (10.0) mm.

Females (16 specimens) wing 81.5-88.7 (84.5), tail 55.8-62.8 (58.9), culmen from base 46.7-52.0 (48.9), tarsus 9.5-10.9 (10.2) mm.

From southern Texas south through eastern and southern México to El Salvador and Guatemala.

Chloroceryle americana isthmica (Goldman)

Averaging slightly smaller; white markings on wing and tail somewhat reduced. Female, with dark breastband broader; dark markings

on sides below this more extensive, in some forming a second band; white of foreneck and breast lightly washed with buff.

Measurements.—See above.

From Honduras through Nicaragua, Costa Rica, and all of Panamá.

Chloroceryle americana americana (Gmelin)

Alcedo americana Gmelin, Syst. Nat., vol. 1, pt. 1, 1788, p. 451. (Cayenne.)

Smaller; male, more heavily spotted with greenish black on lower breast and sides; chestnut of underparts somewhat darker, more extensive on lower foreneck. Female, with black band on breast wider, less broken by white edgings; dark markings on side of breast more extensive, regularly forming a second band; foreneck and lower breast in most individuals strongly suffused with buff.

Measurements.—Males (14 specimens), wing 72.5-78.8 (75.2), tail 51.0-58.1 (53.4), culmen from base 38.0-46.2 (43.4), tarsus 8.2-9.4 (8.8) mm.

Females (13 specimens), wing 73.5-77.2 (75.6), tail 50.6-57.2 (53.5), culmen from base 38.6-45.7 (42.5), tarsus 9.0-9.8 (9.5) mm.

Colombia and Venezuela south to northeastern Bolivia and south-central Brazil.

Those from northwestern Colombia are intermediate toward *isthmica*.

CHLOROCERYLE INDA CHOCOENSIS Todd: Green-and-rufous Kingfisher, Martín Pescador Selvático

Chloroceryle inda chocoensis Todd, Proc. Biol. Soc. Washington, vol. 56, June 16, 1943, p. 47. (El Tambo, Chocó, Colombia.)

Small; dark above; with breast and abdomen rufous, paler on the throat; female similar to male, but with a band of black and white on breast.

Description.—Length 200-220 mm. Adult male, above dark metallic bronze-green, blacker on crown and side of head; forehead, and, in some, the upper lesser wing coverts, speckled lightly with cinnamon-buff; scapulars and interscapulars with concealed white; secondaries with three or four rows of minute white spots; rump and upper tail coverts with a few small flecks of white; primaries dull black, with outer webs dark metallic bronze-green like back; central pair of rectrices like back; others dark bluish green, spotted narrowly with white on the inner webs; a narrow supraloral streak of cinnamon; a white spot on lower eyelid; throat and sides of neck

light orange-buff, partially joined in a narrow broken collar on hind-neck; rest of under surface rufous to deep orange-rufous, with the feathers white basally; under wing coverts and axillars cinnamon; under surface of primaries spotted broadly with white; tibia dull greenish black.

Adult female, like male, but with scanty to very few flecks of white to buffy white on wing coverts, rump and upper tail coverts; upper breast banded widely with black, with the feathers tipped rather broadly with white to buffy white.

Immature, like female, but somewhat more heavily spotted on lower back and wings; males with a narrow black breastband, much broken by rufous spotting and tipping.

A female, taken at Armila, San Blas, February 28, 1963, had the iris brown; base of gonys and lower margin of mandibular rami dull white; rest of bill black; crus, tarsus, and toes dark brownish neutral gray; claws black.

Measurements.—Males (10 from Panamá and Chocó, Colombia), wing 90.0-96.9 (93.7), tail 58.0-63.0 (60.1), culmen from base 49.9-56.1 (52.8), tarsus 9.8-11.6 (11.0) mm.

Females (14 from Panamá), wing 92.6-98.7 (95.8), tail 57.5-64.7 (61.8), culmen from base 49.0-55.0 (52.1), tarsus 10.2-11.3 (10.8) mm.

Resident. Found locally in the lowlands on the Caribbean slope from Bocas del Toro through San Blas; on the Pacific side from eastern Province of Panamá (mouth of Río Chico) east through Darién. Locally in the Archipiélago de las Perlas (islas Víveros, Del Rey, Cañas).

The only report on the Pacific slope west of the Canal Zone is 1 for "Veraguas (Arcé)" listed by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, p. 478). The specimen so labeled, but without other data, is in the British Museum in London. As it is not listed by Salvin in any of his earlier reports of Arcé's collections it seems probable that the locality is wrongly marked and that the bird was taken somewhere near the lower Chagres in what is now the Canal Zone.

Because of their secretive habits usually these small kingfishers are more abundant than is indicated by the relatively few occasions on which they are seen. During my field excursions, in careful search I have found them fairly common in the extensive mangrove swamps around Bahía Almirante in Bocas del Toro, and along heavily forested shores on the Río Chimán, the Río Chucunaque,

and the Río Tuira on the Pacific slope. They range low down, seldom fly in the open, and in foothill areas live in heavily shaded quebradas. There, their dark forms are barely visible as they rise quietly, fly low, and disappear around a bend in the stream. Only rarely does the light catch the reflection of the narrow, pale band across the hindneck. When encountered at rest they sometimes twitch the tail and nod the head like the green kingfisher, but more often they rest quietly behind a screen of leaves.

Those that I have examined have eaten small fish, or in one a small decapod crustacean. In the mangrove swamps near Almirante at the beginning of February they may have been preparing to nest, as on several occasions they were more active than usual. It was there that I heard them calling, first a twitter, followed by a rapidly repeated note, *too-too-too-too*, all in low tone.

The records of Schönwetter (Handb. Ool., pt. 11, 1966, p. 694) report 7 eggs from "Panama bis O.-Perú. u. Santa Catharina" with measurements of $26.0-28.7 \times 21.6-23.2$ mm.

From the excellent series now available the two geographic races that have been described in this species may be recognized from the summary that follows, though in the main on other differences than those suggested in the original description.

Chloroceryle inda inda (Linnaeus)

Alcedo inda Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 179. (Guiana.)

Females, and to a lesser degree males, with back, rump, and upper tail coverts with considerable speckling of white; wings with more extensive white markings; tail averaging slightly longer.

Measurements.—Males (7 specimens from Guyana, Amapá, and Pará), wing 90.5-96.8 (93.7), tail 62.4-65.7 (64.4), culmen from base 49.5-54.8 (52.5), tarsus 10.2-11.1 (10.8) mm.

Females (10 from Surinam, Amapá, and Pará), wing 94.4-100.6 (96.4), tail 61.2-66.9 (64.7), culmen from base 49.5-57.7 (52.1), tarsus 10.5-11.7 (11.3) mm.

The Guianas, and eastern Brazil from Amapá and Pará south to Santa Catharina.

Chloroceryle inda chocoensis Todd

Dorsal surface, except the wings, plain or very slightly spotted with white; tail averaging slightly shorter.

In making comparisons it should be remembered that immature

individuals are somewhat more spotted on the lower back and rump than adults.

Nicaragua, Costa Rica, and Panamá south through Colombia and Venezuela to Ecuador, Mato Grosso, and Amazonas, Brazil.

**CHLOROCERYLE AENEA (Pallas): Pygmy Kingfisher,
Martín Pescador Enano**

Smallest of the American kingfishers.

Description.—Length 130-135 mm. Male, upper surface, including wings and tail, dark metallic green, usually darker on the crown; feathers of back and scapulars with the concealed bases white; an indistinct white spot on the lower eyelid; a narrow streak above lores; front and sides of neck, edge of wing, and under wing coverts light tawny-orange; breast and sides rufous-chestnut; abdomen, under tail coverts, and under wing coverts white; inner webs of primaries and secondaries edged with buffy white; three bands of white or buffy white spots on the distal half of the secondaries (in many these spots are reduced or absent); concealed base of tail white; inner webs of rectrices (except the central pair) spotted with white.

Female, similar to male but with a broad band of greenish black tipped lightly with buff or white across the breast.

Immature, brown of foreneck paler than in the adult female; the dark breastband narrower, more or less broken in the center.

These birds, of small sparrow size, are forest kingfishers that live regularly in mangrove swamps. Less often I have encountered them in the lower hills in forests along quebradas, but not far inland. It is their habit to rest on low perches, where, if they are not actually hidden, their dark colors render them inconspicuous in the heavy shadows that are their haunts. At intervals they twitch the tail and nod the head like the green kingfisher, a movement that may attract the eye. Usually when seen they are near at hand. Their food is minnows and aquatic insects. The usual note is a clicking sound, barely audible, accompanied by a flick of the tail. Less often they utter chattering or chirping calls that are more musical.

As a species these kingfishers range from southern Oaxaca and Veracruz through Middle America to Colombia, Venezuela, and Trinidad, and from there southward to western Ecuador, northern Bolivia (Río Beni), and southern Brazil (Mato Grosso and São Paulo). Two geographic races are recognized from Panamá.

CHLOROCERYLE AENEA AENEA (Pallas)

Alcedo aenea Pallas, in Vroeg, Cat., Adumbrat., 1764 p. 1. (Surinam.)

Characters.—Light bands on secondaries much reduced or absent; concealed white on back and rump decidedly less in amount.

Measurements.—Males (10 from Panamá and northern Chocó), wing 54.3-58.2 (55.7), tail 33.7-38.6 (35.4), culmen from base 29.5-32.7 (31.0), tarsus 8.8-10.6 (9.6) mm.

Females (10 from Panamá), wing 55.7-60.0 (56.7), tail 33.0-38.6 (35.4), culmen from base 28.8-32.8 (31.3), tarsus 8.4-9.5 (8.6) mm.

Resident. Locally fairly common in the lowlands; recorded on the Caribbean slope in Bocas del Toro (Zegla, on the Río Changuinola, and around Laguna de Chiriquí); northern Coclé (El Uracillo); Colón (Colón, Portobelo); northern Canal Zone (Río Chagres drainage from Juan Mina to Barro Colorado Island and Gatun); San Blas (Mandinga, Armila); on the Pacific side in eastern Darién (Río Jaqué). Isla Escudo de Veraguas.

The only Pacific record for Panamá is of one that we caught by hand while night hunting at Imamadó on the Río Jaqué in Darién. A skin in the U. S. National Museum, received from the dealer Boucard, is labeled "Veragua, Arcé" with no further information. It is a specimen of the present race but the data are doubtful, especially since the preparation is not that typical of Arcé's skins. It is probable that it is from the Río Chagres Valley in the Canal Zone.

Belcher and Smooker (Ibis, 1936, pp. 794-795) describe the nesting of this subspecies in Trinidad in holes less than half a meter long dug in the face of a bank, often at some distance from water. The terminal chamber usually is at one side, rather than in a direct line with the entrance. Two nests each contained 4 eggs, the average of one set being 18.8×14.8 mm., and of the other 19.8×15.3 mm. A set of 3 in the British Museum from the Nelson Estate, Trinidad, taken August 28, 1935, (collector not recorded), are white, with smooth glossy surface, subelliptical form, and the following measurements: 18.9×15.5 , 19.0×15.2 and 20.0×15.6 mm. Hellebrekers (Zool. Med. Rijksm. Nat. Hist. Leiden, vol. 24, 1942, p. 253) gives the average of a set of 4 from Surinam as 18.6×15.6 mm.

CHLOROCERYLE AENEA STICTOPTERA (Ridgway)

Ceryle superciliosa stictoptera Ridgway, Proc. Biol. Soc. Washington, vol. 2, April 10, 1884, p. 95. (Sisal, Yucatán.)

Characters.—Secondaries with three definite white bands; concealed white on back and rump extensive.

A male taken near Aguadulce, Coclé, January 22, 1963, had the iris dark brown; base of gonys and lower side of mandibular rami dull buffy white; rest of bill black; tarsus and toes dusky neutral gray; claws black.

A female collected near Puerto Armuelles, Chiriquí, March 13, 1966, was similar, but with the light area on the lower side of the bill somewhat brownish white, and the tarsus, toes, and claws fuscous-black.

Measurements.—Males (18 from México, Honduras, northern and western Costa Rica, and the Pacific slope of Panamá), wing 54.4-60.7 (57.6), tail 34.1-39.0 (35.7), culmen from base 30.0-36.8 (32.9), tarsus 8.0-9.9 (8.7) mm.

Females (12 from México, Guatemala, Honduras, western Costa Rica, Chiriquí, and Los Santos), wing 56.5-62.7 (58.8), tail 34.6-37.7 (35.8), culmen from base 29.4-34.3 (32.2), tarsus 8.0-9.8 (8.7) mm.

Resident. Local near the coast in Chiriquí (Puerto Armuelles, Divalá, Las Lajas), Los Santos (Tonosí, Pedasí), Coclé (Aguadulce), and eastern Province of Panamá (Chico). Isla Coiba.

In Panamá birds of this race have been found only in the lowlands on the Pacific slope, mainly on the borders of mangrove swamps, less frequently farther inland. The greater extent of the white markings is seen only on careful comparison.

Family MOMOTIDAE: Motmots; Momótidos

The eight species of this interesting family are distributed widely from México through Central America and South America south to northern Argentina. Motmots vary in habit from those that live in thickets or open tree growth to others found in the heavy shadows of humid forests. They are most abundant throughout the tropical lowlands, extending in mountain areas to the Subtropical Zone, with one, *Aspatha gularis*, found in the lower Temperate Zone forests from southern México to El Salvador and Honduras. All have strong bills, that may be flat or conical according to the species, with the cutting edges coarsely or finely serrated, and short, rounded wings. The tail in seven is long and graduated, with the central rectrices slender and narrowed above the tips. In some these fully developed feathers are spatulate at the end when fully grown. It was believed earlier that the bird made this racket tip by trimming

the feathers with its bill. It is now recognized that attachment of the barbs to the feather shaft becomes weak as the feather matures, so that the individual filaments break off through friction when the tail strikes leaves or branches as the motmot moves about. It is interesting that in some the feather vane may remain entire, though in general appearance these birds closely resemble others with racket tips.

Motmots nest in burrows that they dig in earthen banks, in which their white eggs are laid on the earth of a chamber that has no nest lining. The birds associate in pairs, or outside the nesting season may be found alone. The four species that live in Panamá range in size from the smallest of the family, the tody motmot, to the largest, the rufous motmot.

KEY TO SPECIES OF MOMOTIDAE

1. Small, wing less than 80 mm.; tail shorter than wing.
 Tody motmot, *Hylomanes momotula obscurus*, p. 438
 Large, wing more than 100 mm., tail decidedly longer than wing 2
2. Bill broad and flattened; very finely serrated on cutting edges of maxilla and mandible.
 Broad-billed motmot, *Electron platyrhynchum minor*, p. 441
 Bill compressed and rounded; serrations on cutting edges of maxilla and mandible coarse and prominent 3
3. Crown black centrally, bordered broadly with blue; throat, foreneck and breast green or dull brownish green.
 Blue-crowned motmot, *Momotus momota*, p. 448
 Entire head, foreneck, and breast rufous-brown, except for black band through eyes, and spot on breast.
 Rufous motmot, *Baryphthengus martii semirufus*, p. 444

HYLOMANES MOMOTULA OBSCURUS Nelson: Tody motmot, Bobito

FIGURE 51

Hylomanes momotula obscurus Nelson, Smithsonian Misc. Coll., vol. 56, no. 22, September 7, 1911, p. 1. (Cerro Bruja, Colón, Panamá.)

A small motmot, with short tail, without racket-shaped tips.

Description.—Length 160-190 mm. Tail slightly shorter than wing; feathers of the throat, especially those on the side, slightly elongated. Adult (sexes alike), forecrown dull olive-green with a faint buffy to rusty wash, changing behind the level of the eye to cinnamon-rufous or russet, which extends over the hindneck; a line of greenish blue on either side of the crown; rest of upper surface dull green, with the edgings of the coverts and larger wing feathers duller; a broad

black streak across side of head below and behind eye; lores to supranasal feathers white to buffy white, continued as a rictal streak below the black auricular area; center of throat dull buff, in some mixed with dusky, with a broad line of white to buffy white on either side; sides and front of neck olive greenish, browner on the upper breast and sides; lower breast and flanks greener; center of abdomen white; under tail coverts buff; under wing coverts cinnamon-buff, mixed on edge of wing with dull olive-green.

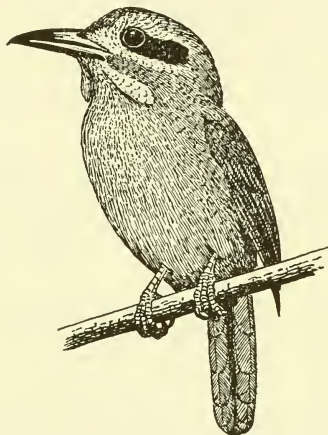


FIGURE 51.—Tody motmot, bobito, *Hylomanes momotula obscurus*.

Measurements.—Males (12 from Darién), wing 68.9-73.6 (72.0), tail 53.8-61.6 (58.7, average of 11), culmen from base 25.7-31.1 (29.5), tarsus 17.9-19.8 (18.7) mm.

Females (12 from eastern Panamá), wing 69.2-74.9 (71.5), tail 57.8-63.0 (59.1), culmen from base 24.8-32.7 (28.9), tarsus 17.9-20.2 (18.9) mm.

Resident. Found locally in forested hill country from eastern Colón (Cerro Bruja), and eastern Province of Panamá (Cerro Azul), to the Colombian boundary.

Little is known of this interesting species in Panamá, aside from the few specimens that have been collected. The tody motmot is found alone or in pairs, resting quietly in open undergrowth in humid forest, where their rather dull coloration renders them in-

conspicuous in their shadowy haunts. Only the greenish blue line on the side of the crown may reflect the dim light, a spot of color that sometimes catches the eye.

The first record for Panamá was a female taken June 7, 1911, by E. A. Goldman from 2 seen at 600 meters on Cerro Bruja, back of Portobelo, Colón. The following year between February and June he secured 2 males and 2 females between 550 and 1,000 meters on Cerro Pirre, Darién. Benson collected others here in March and April 1928. Thomas Barbour (Bangs and Barbour, Bull. Mus. Comp. Zool., vol. 65, 1922, p. 198) obtained a male April 22, 1922, on Cerro Sapo, Darién, brought to him by an aged Negro who "had killed it high on the slopes of Cerro de Sapo." Griscom (idem, vol. 72, 1932, p. 339) lists 1 taken by H. von Wedel, labeled Puerto Obaldía, San Blas.

In my own field studies I collected my first specimen on April 3, 1947, near our camp at the mouth of the Río Imamadó on the upper Río Jaqué, Darién (elevation about 100 meters). Another was taken April 23, 1949, on the Quebrada Carriaso, at about 250 meters in the northern end of the Cerro Azul, Panamá. As I followed a small mountain stream in the forest a glint of blue through the leaves in the top of the low undergrowth caught my eye, but only when I examined it with my field glasses did I realize that it came from the head of this bird and not from a butterfly. The following year, on March 14, 1950, we secured another at 500 meters elevation on Cerro Chucantí, in the eastern end of the Province of Panamá. More recent records from Darién include 4 secured in 1963 by Dr. Pedro Galindo on the lower slopes of Cerro Tacarcuna, 3 from the ridge at La Laguna at about 900 meters, taken June 6 to 26, and 1 from 575 meters on the Río Tacarcuna, July 18.

In the stomachs of 3 that I have examined I found remains of a large spider in one, a small snail in another, and a variety of insects in all, among these fragments of beetles, orthoptera, homoptera, several caterpillars, and a few ants.

These birds often have clay soil adhering to the bill and staining the end of the tail, with the latter regularly frayed and worn. Though there seems to be nothing recorded of their breeding habits it is apparent that they follow the custom of other species of the family in nesting in holes dug in the earth.

The subspecies *obscurus* differs from typical *Hylomanes m. momotula* in distinctly darker breast, and darker, duller green upper surface, with the chestnut of the back of the crown averaging darker.

Beyond Panamá this race ranges in northwestern Colombia in northern Antioquia (Dabeiba, Villa Artiaga, Valdivia) and western Córdoba (Socarré, Quebrada Salvajín). These Colombian specimens, collected between 1948 and 1950 by M. A. Carriker, Jr., may be regarded as typical of the race in the amount of dark coloration. The type, and the rest of the series from Panamá average somewhat paler, and are thus intermediate toward nominate *momotula*, but are to be placed with the darker group.

Hylomanes momotula momotula Lichtenstein is not only lighter on the breast and foreneck, but averages whiter on the abdomen. In earlier studies on a collection of birds from northwestern Costa Rica (Proc. U. S. Nat. Mus., vol. 95, 1944, p. 51) I identified 2 specimens collected on the Cerro Santa María, Guanacaste, as the race *obscurus*. With the additional material typical of this southern form now available I find that this was incorrect, and that these belong with *momotula*. That form, therefore, has a range extending from southern México to northwestern Costa Rica. Another race *H. m. chiapensis* described by Brodkorb from the Pacific slope of Cerro Ovando, Chiapas, needs further study to clearly determine its distinctive characters.

**ELECTRON PLATYRHYNCHUM MINOR (Hartert): Broad-billed
Motmot, Pájaro-raqueta Piquiancho**

FIGURE 52

Prionirhynchus platyrhynchus minor Hartert, Nov. Zool., vol. 5, December 31, 1898, p. 498. (Panamá = Río Cascajal, Caribbean slope of Coclé, Panamá.)
Electron platyrhynchus suboles Nelson, Smithsonian Misc. Coll., vol. 60, no. 3, September 24 (= Sept. 27), 1912, p. 5. (Cana, 600 meters elevation, Darién.)

Of medium size, with head and neck rufous, except for black band through eye; chin greenish blue like the abdomen; black spot on lower foreneck large, composed of long, broad feathers.

Description.—Length 300-350 mm. Bill broad, flat, and decurved, with a conspicuous keel that extends the length of the center of the maxilla. Adults (sexes alike), crown and hindneck cinnamon-rufous; upper surface olivaceous green; wing coverts and secondaries clearer green; outer webs of outer primaries, primary coverts, and alula more bluish green; inner webs of primaries and secondaries sooty black; upper surface of tail greenish blue; under surface of tail and tips of central pair of rectrices blackish slate; throat, neck, and chest cinnamon-rufous like crown; circlet bordering eyelids, lores, stripe on side of head and large spot at base of foreneck black; sides,

flanks, abdomen, and under tail coverts green to bluish green; under wing coverts dull dark gray washed with buff; edges of wing bluish green.

Numerous specimens (most of them females) are bluish green on the abdomen.

Iris wood brown to dark wood brown; bill black, some with the extreme tip dull brownish white; inside of mouth black, with the tongue fuscous; tarsus and toes deep neutral gray to fuscous-black, claws black.

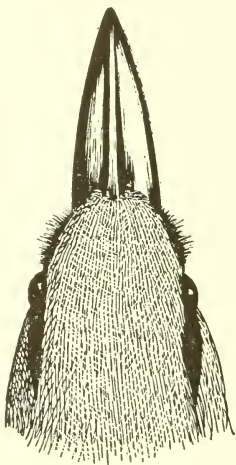


FIGURE 52.—Head of broad-billed motmot, pájaro-raqueta piquiancha, *Electron platyrhynchum minor*.

Measurements.—Males (10 from Panamá), wing 107.8-117.3 (113.1), tail 167.0-187.0 (175.4), culmen from base 37.5-41.8 (40.3), tarsus 17.3-19.8 (18.5) mm.

Females (10 from Panamá and Costa Rica), wing 109.0-116.7 (112.4), tail 160.0-183.0 (171.2), culmen from base 38.0-41.7 (39.3), tarsus 18.0-19.5 (18.8) mm.

Resident. Fairly common in forested areas, mainly in the lowlands and in lower hill country; less numerous in the lower upper Tropical Zone. Recorded from 900 to 1,450 meters on the Caribbean slope of Volcán de Chiriquí, at 850 meters on Cerro Campana, Panamá,

and in Darién, at 575 meters on the upper Río Tacarcuna, and 600 meters on Cerro Pirre.

In eastern Chiriquí to date this motmot has been recorded only from near San Félix, where 1 (in the collection of the California Academy of Sciences) was collected by Mrs. Davidson on December 5, 1931. On the Caribbean slope of Volcán de Chiriquí in Bocas del Toro, it has been found along the upper course of the trail leading from Boquete to the lowlands. There are records for Santa Fé and Chitra in Veraguas, and in Coclé I have recorded it on the Pacific side at El Valle, and on the Caribbean slope at El Uracillo. It is found also lower down on the Río Indio in western Colón. I secured 1 on Cerro Campana March 31, 1951. They are fairly common in the Chagres drainage in the Canal Zone near Gamboa, and on Barro Colorado Island. Eastward they range in hill country through eastern Colón to eastern San Blas, and in Darién.

I have observed this motmot most often in the middle and high tree crown, often near the edge of forest, or where the growth was more open. Their presence usually has been detected from their calls, but when heard they may be found only after considerable search, as they may be hidden from below by a screen of leaves. When finally located the bird may rest on an open perch, with the bill pointing at an angle upward. The common note is *carw-w-w*, a curious snoring sound, difficult to trace to its source. Near at hand it seems fairly loud and resonant, but coming from high in the trees it is reduced in carrying power.

The nesting season in Panamá comes in March, when the birds are more vociferous, and then they may be found in undergrowth along barrancas, where they locate their nest holes. There seems to be little known of their nesting. An egg in the collections of the British Museum collected at Cachí, Costa Rica, May 26, 1900, is dull white, with faint gloss. It is elliptical in form and measures 29.9×24.9 mm.

I have seen them fly out to seize insects from adjacent branches and then return to the original perch. The stomach of one taken by Goldman at Cana held a moth, a snout beetle, and other insect remains. One taken by Hallinan (Auk, 1924, p. 314) had eaten a caterpillar.

In his original description Hartert wrote "type: ♂, Panamá, February 13, 1889, Heyde coll." From the dates on the specimens in the U. S. National Museum purchased from the collections made by H. Th. Heyde and Ernesto Lux I have made an itinerary from which I find that on the date given by Hartert they were on the Río Cascajal, a tributary of Río Coclé del Norte on the Caribbean slope

of Coclé. I have, therefore, designated this as the restricted type locality.

Nelson described a race *suboles* from a single specimen taken by Goldman at Cana on the slopes of Cerro Pirre, Darién. This proves not valid when compared with the more extensive material from eastern Panamá now available.

BARYPHTHENGUS MARTII SEMIRUFUS Sclater: Rufous
Motmot, Pájaro-raqueta Acanelado

FIGURE 53

Momotus semirufus P. L. Sclater, Rev. et Mag. Zool., ser. 2, vol. 5, November 1853, p. 489. ("Santa Martha, in Novâ Granadâ" = Middle Magdalena Valley, Colombia.)

Baryphthengus martii costaricensis Todd, Proc. Biol. Soc. Washington, vol. 56, June 16, 1943, p. 48. (Cuabre, Río Sixaola, Costa Rica.)

Large; head and anterior underparts rufous-cinnamon; a broad black band on side of head; spot on lower foreneck plain black.

Description.—Length 420 to 470 mm.; ten rectrices. Adult (sexes alike), crown and hindneck cinnamon-rufous; back, wing coverts and outer webs of secondaries dark green; alula and primary coverts bluish green; outer webs of primaries greenish blue, changing to violet-blue on the outermost; inner webs of primaries and secondaries dull black; upper tail coverts greenish blue; tail bluish green, changing distally to greenish blue, with the two central rectrices tipped with black; shafts of all tail feathers black; a broad black band on the side of the head from the lores through the eye to the auricular region; feathers in the latter area elongated; throat, foreneck and breast tawny-ochraceous, deepening to cinnamon-rufous on sides and abdomen; a small, slightly elongated tuft of black feathers in center of lower foreneck; flanks, tibia, lower abdomen, and under tail coverts light bluish green; under wing coverts dull verdigris-green.

Juvenile, in general like adult, but with feathers of foreneck and upper breast paler, duller brown, indistinctly spotted on the outer webs with cinnamon-buff; central pair of rectrices uniform in width without the spatulate tip.

An adult male taken on Cerro Campana, Panamá, March 12, 1951, had the iris dark brown; bill black; tarsus and toes dark neutral gray; claws black. In another of the same sex, collected near Armila, San Blas, March 4, 1963, the iris and bill were like the first, but the

tarsus, toes, and claws were black. The inside of the mouth and tongue were deep black.

Measurements.—Males (23 from Panamá), wing 142.0-155.0 (153.8), tail 243.0-305.0 (265.5), culmen from base 47.9-52.2 (50.1), tarsus 31.0-34.2 (32.5) mm.

Females (13 from Panamá), wing 139.4-149.0 (144.4), tail 226-285 (252.3), culmen from base 44.3-54.5 (49.5), tarsus 29.8-33.5 (32.0) mm.

Resident. Widely distributed in more humid forested areas. On the Pacific slope from western Veraguas eastward, mainly inland in hill country, through Darién; on the Caribbean side more common

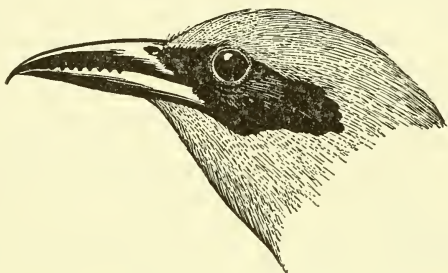


FIGURE 53.—Head of rufous motmot, pájaro-raqueta acanelado, *Baryphthengus martii semirufus*.

from western Bocas del Toro east through the Chagres Valley and San Blas to the Colombian boundary.

There are no records to date for the whole of Chiriquí, or from the Azuero Peninsula. It is probable that deforestation has restricted its range on the Pacific side of Veraguas. Though Salvin (Proc. Zool. Soc. London, 1867, p. 151; 1870, p. 201) recorded specimens taken by Arcé at Santiago, Calobre, and Santa Fé, in 1953 I found the species only near Soná, and there in small numbers. In western Coclé I recorded it on the higher slopes at El Valle in 1951, and in the western sector of the Province of Panamá found a few on Cerro Campana, and one at Bejuco in the lowlands. In eastern Panamá Province it is found on Cerro Azul, and from Chimán eastward through Darién it is more common, though mainly in hill country. Here it has been recorded on Cerro Sapo, Cerro Pirre (to 550 meters), and Cerro Tacarcuna (to 1,280 meters).

On the Caribbean slope the species is more common and is more evenly distributed. It is found through Bocas del Toro from the Costa Rican boundary eastward, ranging in the heavy forests of the lower mountain slopes to 730 meters on the upper Río Changuena, and to 450 meters on the trail leading to Boquete. In 1952 I found it along the Río Indio from Chilar, above the mouth in western Colón, to El Uracillo in the foothills of northern Coclé. A fair number persist scattered through the northern Canal Zone and the valleys of the rivers tributary to the Chagres above Madden Lake. And it continues through eastern Colón (Portobelo) and the San Blas, where it is known from Mandinga in the west, and from Permé, Armila, and Puerto Obaldía in the east.

This motmot is a forest species, found regularly in pairs, and more often heard than seen. They rest quietly on horizontal perches, partly concealed in the taller undergrowth, or among the leaves in the lower levels of the tree crown above. Like the blue-crowned motmot, they regularly swing the tail like a pendulum from side to side, with the body nearly motionless and the tail moving in an arc. The usual call, heard regularly at dawn and also during the day, is a low *hoot-oot* with the accent on the first syllable, varied regularly to three syllables, and occasionally with the second repeated alone several times as a rolling call. The tone is louder, more vehement, and usually harsher than that of the blue-crown, so that with familiarity the two may be distinguished if not too far distant. Sometimes, in remote forests, a gunshot has started a chorus of calls from birds near and far, hidden among leaves and so unseen. Like the blue-crown, this species is often called *juró*, varied to *jurocito*, in imitation of its note. Others call these birds *tamborilero*, as their notes at a distance suggest the muffled beat of a *tambor* or drum.

The food is partly animal, partly vegetable. I have seen one eating a small lizard, and others feeding on drupes of shrubs and trees in the forest. Stomachs that I have examined have held fragments of large orthoptera, caterpillars, and wasps, also seeds and berries. Hallinan (Auk, 1924, p. 314) found spiders, beetles (some an inch long) and a small fish in one. Stone (Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, p. 252) records a small crab, entire, in one taken by Jewel at Gatun. In observations on Barro Colorado Island R. A. Johnson (Proc. Linn. Soc. New York, nos. 63-65, 1954, p. 59) noted these motmots over raiding ant swarms, reporting that the birds "sit rather quietly on a horizontal liana or branch,

watching the moving ant columns working up tree-trunks and vines. When a prey animal moves out to escape the ants, the motmot pursues, taking the prey from the trunk of a tree or the leaf of a palm. I watched one take a large scorpion and spend five minutes killing the creature before swallowing it whole."

The nesting period in Panamá comes in February and March, nest burrows being dug in steep-banked barrancas. I have seen no record of the eggs.

The species is one that is seriously affected by cutting the forests that are its haunts, as it seems less adaptable than the blue-headed motmot. The eastern race *Momotus m. conexus* of the smaller species is found in the same general areas as the rufous motmot, though the latter ranges more in the heavier forests of the hills. Neither species seems to be sufficiently abundant for active competition between them.

To the north the rufous motmot ranges through the lower Caribbean slope of Costa Rica to eastern Nicaragua. Southward it is found along the Pacific slope of Colombia to western Ecuador, in the north and east to the middle Magdalena Valley.

P. L. Sclater in the original description of *semirufus* wrote that he was indebted to the Verreaux firm for the privilege of describing it and another motmot "reçues tout recemment de Saint-Marthe" and at the end wrote "Habitat: Santa-Martha, in Novâ Granadâ, et ad Rivum Rio-Javarri dictum." Two years later Sclater in a list of the species of birds "received in collections from Santa Fe di Bogota" (Proc. Zool. Soc. London, 1855, p. 136), included *semirufus* with the remark that he "was inclined to think" that it was the same as the motmot described by Spix under the name *martii*. And in a review of the motmot family (idem, 1857, pp. 254-255) under *semirufus* lists it as "Hab. New Grenada, Santa Martha and Bogota: Rio Napo Ecuador (*Jameson*); Upper Peruvian Amazon, Rio Javarri (Cast. et Dev.)" with the explanation that he had seen one labeled Bogotá, and another collected by "Castelnau and Deville on the Rio Javarri." He remarked again that *semirufus* seemed to resemble *martii* of Spix.

It has been recognized generally that the allocation of the original specimens to Santa Marta came through error as the bird is not found in that region. De Schauensee (*Caldasia*, no. 23, 1949, p. 599) in stating this fact wrote that it was "probable that the type came through Santa Marta from the Middle Magdalena Valley." It seems appropriate from this to designate the latter area as the type locality.

Todd separated the motmots of this group from Costa Rica under the subspecific name *costaricensis* on the basis of larger size and a few differences in coloration. The considerable series now available from Panamá and Colombia show equivalent variations in color that match those he described. The supposed distinction in size also is covered. Todd lists the following measurements from Costa Rica: Males (3 specimens), wing 154-155, tail 284-315, bill 47-52, tarsus 31-34 mm. Females (4 specimens), wing 147-153, tail 250-288, bill 45-48, tarsus 30-32 mm. Measurements from the series from Panamá are given above. The following are from our specimens from Colombia: Males (19 specimens), wing 142.7-155.8, tail 231-280, culmen from base 44.2-57.7, tarsus 29.8-33.5 mm. Females (15 specimens), wing 140-151.1, tail 229-268, culmen from base 42.3-50.5, tarsus 29-32.9 mm. The only difference of any marked extent is in the length of tail, which is too highly variable to be of value, due to individual differences and to wear.

The more northern forms of this group, in which the anterior under surface from the throat down over the breast is wholly tawny-brown, have been listed as races of the more southern *Baryphthengus ruficapillus* in which the foreneck and breast are plain green. In the latter also the tail does not have the racket tip. Though the birds of this genus all are obviously closely related, the differences mentioned are so definite that two allied but separate species are indicated.

MOMOTUS MOMOTA (Linnaeus): Blue-crowned Motmot, Pájaro-raqueta de Coronilla Azulada

FIGURE 54

Ramphastos momota Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 152. (Cayenne.)

Large; crown black centrally, bordered with light to dark blue; black spot on lower foreneck edged narrowly with greenish blue.

Description.—Length 360-420 mm. Twelve rectrices. Adult (sexes alike), forehead, lores, and band through eye to auricular region (where it terminates in a point) black, bordered below and on upper margin of auricular area by a line of light greenish blue; center of crown black, bordered all around by light greenish blue, this in turn edged with violet-blue around the posterior margin (the blue-tipped feathers black at base); back to upper tail coverts olive-green; tail green to bluish green, more blue distally, with racket tip blue tipped with black; wings green, more or less bluish on outer webs of primaries; under surface, varying according to race, from

light olive-green, more or less washed with cinnamon on sides, to dull rufous-cinnamon; an elongate spot of black, bordered with greenish blue, on center of upper breast.

The blue-crowned motmots as a group range widely from México through Central America and northern and eastern South America to northern Argentina. Currently all are grouped under the name *Momotus momota*, with numerous populations recognized as subspecies. Two of these are found in the Isthmus of Panamá, one in the west, and one in the east. The two are so distinct in general coloration that they are easily separable when examined in the hand, but in life in the subdued light of their usual forest habitat these differences generally are not evident.

Locally in Panamá the two larger species of motmot are called *juró*, or sometimes *barranquero*, without recognition that they are distinct. Many persons believe that they are owls (*buhos*), from their soft call notes.

MOMOTUS MOMOTA LESSONII Lesson

Momotus momota lessonii Lesson, Rev. Zool., vol. 5, June 1842, p. 174. (Realejo, Nicaragua.)

Characters.—Throat, lower breast, and abdomen distinctly light green; under wing coverts grayish to slightly dull greenish buff, occasionally indistinctly banded with pale cinnamon-buff; somewhat larger.

A female, taken on the Río Guánico, at Las Palmitas, Los Santos, January 21, 1962, had the iris dull red; base of gonys and lower edge of rami dull brownish white; rest of bill black; tarsus fuscous; toes fuscous-black; claws black.

Measurements.—Males (31 from Chiriquí, Veraguas, Los Santos, and Herrera), wing 130.8-141.6 (136.7), tail 211-245 (226.5), culmen from base 41.3-48.6 (46.1), tarsus 27.6-31.1 (29.4) mm.

Females (23 from Chiriquí, Veraguas, Los Santos, and Herrera), wing 130.2-140.0 (134.9), tail 205-227 (217.5), culmen from base 41.0-47.4 (44.4), tarsus 28.0-31.4 (29.4) mm.

Resident. Locally common on the Pacific slope in Chiriquí, Veraguas, Los Santos, and Herrera, from sea level in the lowlands to 1,825 meters on Volcán de Chiriqui.

It is probable that 2 motmots that I saw but did not collect on the higher slopes at El Valle in eastern Coclé on April 1, 1951, and June 22, 1953, were this race, but occurrence of the species *Momotus momota* in that area needs verification.

In 1966 I found these birds from near the sea at Puerto Armuelles to Punta Balsa near the end of the Burica Peninsula. They were found also near the sea at Olivo at the eastern base of the peninsula, and in 1960 at Santa Gallo and La Barqueta south of Alanje. They do not occur on offshore islands (specimens from J. H. Batty marked from Canal de Afuera, Gobernadora, and Cébaco being questionable, as I have visited these islands, and those labeled Sevilla and Brava doubtful).

These motmots range in forest, usually in more open areas, but are found also in second growth, and in the hill country in coffee plantations. In the lowlands they may frequent open thickets in pasturelands. They seem thus more adaptable than many other forest birds as they remain in small tracts of trees where there is undergrowth when the main stand is cut. On the eastern side of the Azuero Peninsula some frequent the rather scanty tree and thicket growth in the steep-banked quebradas.

Their presence often is made known by their low, single or double-noted call, *hoot, hoot*, repeated rather quickly. When excited the sound may be uttered so rapidly that it becomes a rolling note. Their normal custom is to rest quietly with the body inclined only slightly forward from the perpendicular, with the head drawn in, and the tail hanging motionless. When stimulated by some unusual circumstance, but not frightened, the tail is swung from side to side like a clock pendulum, and may be vibrated up and down. Their flight through the trees or thickets (not in the open air above) is rapid and direct, perhaps from a low perch to a higher one. At times they seem wary, though usually it is not difficult to approach them. When they are seen low down in undergrowth the blue to greenish border on the forehead and side of crown seems to reflect light even in dark shadow, so that it may serve as a recognition mark.

The birds regularly are found two together, or near one another, an association that I have learned when checked usually proved to be a pair. The nesting period in western Panamá appears to come in February and March. On several occasions I have found them at this time near steeply sloping banks, and have taken birds with fresh earth adhering to the bill. March 17, 1965, at Palo Santo, Chiriquí, I flushed a motmot from a hole dug in a bank on a steep slope along a trail leading down to the Río Chiriquí Viejo. The burrow ran back for a meter through sandy soil, sloping slightly

upward from a horizontal line as it proceeded. I was disappointed not to find eggs. As motmots do not line the nest cavity it is probable that the burrow had been used earlier by some other hole-nesting bird as at the end there was a pad of fine rootlets, mixed with a little moss, irregular in outline, about 15 centimeters in diameter and 15 to 25 millimeters thick.

Skutch, in a study of this subspecies in Costa Rica (Ibis, 1964, pp. 321-332) found that the birds live in pairs for most of the year. Birds engaged in what appeared to be courtship displays carried green leaves or bits of twig in the bill, though such materials were not taken into their nests. Excavation of the nest burrows began in the wet season from August to October, and continued for more than 2 months, though the burrow when completed was not used for sleeping quarters, and was seldom visited until the following March or April when 3 white eggs were laid in the unlined nest chamber. Incubation was shared by male and female, the period being about 3 weeks. Young are naked when hatched. Adults eat a variety of insects, spiders, small lizards, and fruits of various kinds. The young are fed insects, including caterpillars. These motmots are reported to capture birds occasionally, and once Skutch saw parents bring a small bird, apparently adult, but not identified. The nest burrow may be used for more than one season, sometimes alternately with other hole-nesting birds.

The race *lessonii*, described by René-Primavère Lesson, with the type locality Realejo in Nicaragua, was named in honor of his brother Dr. Adolphe Lesson. The population of western Panamá differs from that of farther north in slightly larger bill, and also in somewhat greener colors. With the series now available the average larger bill size is apparent, but with much overlap in range from small to large. On present information the difference does not warrant separation of another form. The following measurements of a series from Nicaragua and Costa Rica are included for comparison with those from Panamá given above:

Males (15), 129.7-144.9 (136.3), tail 215.0-245.0 (229.9), culmen from base 38.0-45.7 (41.8), tarsus 27.0-31.0 (29.0) mm.

Females (6), wing 127.6-140.8 (135.2), tail 217-245 (230.8), culmen from base 39.8-43.0 (41.4), tarsus 26.8-29.0 (27.9) mm.

The subspecies *lessonii* ranges north through Central America to southern México. (For discussion of the Mexican population see Wetmore, Proc. U. S. Nat. Mus., vol. 93, 1943, p. 268.)

MOMOTUS MOMOTA CONEXUS Thayer and Bangs

Momotus conexus Thayer and Bangs, Bull. Mus. Comp. Zool., vol. 46, January 1906, p. 215. (Panamá City, Panamá.)

Momotus conexus reconditus Nelson, Smithsonian Misc. Coll., vol. 60, no. 3, September 24 (= Sept. 27), 1912, p. 4. (Marragantí, Darién, Panamá.)

Characters.—Distinctly darker on lower surface, with the throat, lower breast, and abdomen dull brown, rather than green; somewhat smaller.

A female taken near Chimán, Panamá, February 23, 1950, had the iris dull reddish brown around the pupil, changing to brownish yellow at the outer margin; bill black; upper half of tarsus dull brown, with the scutes edged with dark neutral gray, changing lower down, and over the toes, to dark neutral gray throughout.

Measurements.—Males (10 from Canal Zone, eastern Province of Panamá, and Darién), wing 123.5-133.1 (129.0), tail 220-258 (238.0), culmen from base 39.6-45.5 (42.7), tarsus 29.1-32.8 (30.1) mm.

Females (10 from Canal Zone, eastern Province of Panamá, and Darién), wing 119.3-128.9 (125.9), tail 216-241 (236.0), culmen from base 38.6-43.1 (41.5), tarsus 28.6-30.5 (29.2) mm.

Resident. Common throughout the lowlands where there is forest cover; recorded on the Pacific slope from Capi, western Province of Panamá, eastward through Darién; on the Caribbean side in the Canal Zone and the lower Chagres Valley inland to Madden Dam; also recorded in eastern San Blas at Permé and Puerto Obaldía.

In the Canal Zone this race is found in the lower valley of the Río Chagres from above Juan Mina near Madden Dam, to below Gatun. In the western sector of the Province of Panamá 1 was collected by Carl Bovallius near the mouth of the Río Caimito on June 3, 1882, presumably near Puerto de Chorrera on the coast, as he traveled by schooner. There is also a specimen in the U.S. National Museum, labeled Chorrera, taken "early in 1914," presented by James Zetek, in which the locality is considered authentic. The most western record is a male in the Carnegie Museum, collected at Capi, April 13, 1939, by Arthur C. Twomey. In Darién I found them common in the valley of the Río Tuira and the Río Chucunaque. They are recorded also at Garachiné, and in the lower valley of the Río Sambú. At the mouth of the Río Imamadó, in the upper Río Jaqué drainage, I heard one or two calling regularly from hills near our camp, but did not succeed in locating them. From the far eastern San Blas, H. von Wedel forwarded 3 from Permé to Griscom (Bull. Mus.

Comp. Zool., vol. 72, 1932, p. 339), and collected 1 on October 25, 1932, near Puerto Obaldía, which is in the Brandt collection in the Museum of the University of Cincinnati.

In my experience this race of the blue-crowned motmot does not range above the Tropical Zone, as my records for it come wholly from the lowlands, and the lower hill country inland. It is found

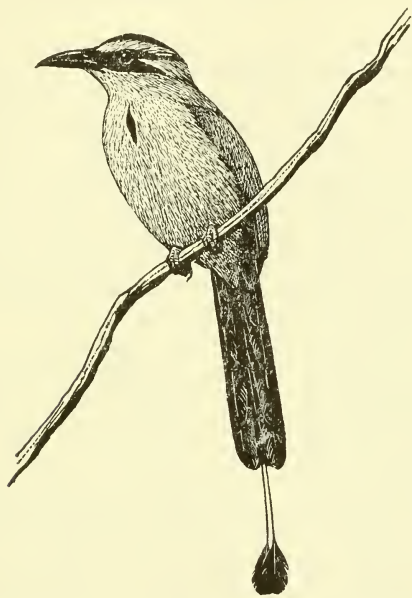


FIGURE 54.—Blue-crowned motmot, pájaro-raqueta de coronilla azulada, *Momotus momota*.

regularly in gallery forest, and in the savannas along the narrow stands of trees and thickets that border the streams that cross these open lands. They range regularly two together, presumed to be pairs, and usually are tame. In some areas, however, especially where they are few in number, they may be heard frequently but are so shy that it may be difficult to find them. I have been aware of them near jungle camps in several localities, where I heard them calling daily at dawn, but did not actually see them. The usual call, *hoo-*

hoot, a low double note, comes at the first hint of morning light, and continues until sunrise when they become silent. When nesting, which seems to come in the period from February to April, they may be more vociferous, with the notes repeated several times rather rapidly, producing a low-toned, rolling call. The calls are similar to those of the larger rufous motmot, but are uttered more softly, so that the voices of the two may be recognized with sufficient experience.

I have found them feeding at times on berries produced by forest trees and shrubs, and also eating large insects. The stomach of 1 taken by Goldman, that I examined in the laboratory, held a large orthopteran and a scarabaeid beetle. They also capture lizards.

The nests are placed in burrows dug in banks, or in areas where the ground is only slightly sloping. At the mouth of the Río Paya in Darién, in the middle of February, I found several of their burrows dug in sandy soil where the ground had only a moderate slope. Near the La Jagua Hunting Club I saw 1 resting a few centimeters off the ground, and found that the bird had started a hole between two roots that projected as ridges from the base of a tree.

Eggs of the allied race *Momotus m. bahamensis* in Trinidad and Tobago, a bird of similar size, are described by Belcher and Smooker (Ibis, 1936, p. 795) as "broad, roundish ovals, of a pure glossy white, smooth and hard-shelled." For 2 sets of 3 eggs each they give the range of measurements as $32\text{-}34 \times 27\text{-}27.8$ mm.

The subspecific status of these motmots in eastern Panamá and northwestern Colombia has been confused through attempted recognition of two forms—*conexus*, described in 1906 from Panamá City, believed to be greener above and somewhat lighter below, ranging east to the vicinity of Punta Garachiné, and found also in the Magdalena Valley, Colombia, and *reconditus*, named in 1912 from Maragantí, at the head of tidewater below Boca de Cupe on the lower Río Tuira. This was supposed to be darker, both above and below, and resident in far eastern Darién and the valley of the Río Atrato. With the larger series of specimens now available the supposed differences are seen to be only individual variation. While part are greener above, others throughout are dark, without regard to the supposed geographic segregation. Under this finding the entire population must be covered by the older name *conexus*. Beyond Darién, this subspecies ranges in northwestern Colombia, in northeastern

Chocó (Unguía, Acandí), central Córdoba, and northern Antioquia to the middle Río Cauca (Regeneración, La Raya) in southern Bolívar. Toward the Río Magdalena in eastern Córdoba and northwestern and central Bolívar there is intergradation with *Momotus momota subrufescens* Sclater, found through the lowlands of much of the northern part of that country.

Order PICIFORMES

Family GALBULIDAE: Jacamars; Barranqueros y
Tucucos de Montaña

The 15 species of this New World family are found from México to northern Argentina, with their greatest variety in the vast valley of the Amazon. The three found in Panamá, like their companions elsewhere, are birds of slender form, forest-dwellers, that live on insects, which they seize from leaves or branches, or expertly from the air. Some, of medium size, are adept in the capture of butterflies, not a common food for birds, taking even those of quick, erratic flight, and larger kinds like the brilliant blue morphos, and the swallow-tails. They nest in burrows, usually in earthen banks, though rarely some have their shelters in cavities in the domed homes of termites. Eggs are white, and those species in which the young have been seen on hatching have a body covering of long filamentous down. Little or nothing is known in detail of the nesting and other habits of a majority of the species.

KEY TO SPECIES OF GALBULIDAE

1. Large; wing more than 100 millimeters; bill broad and heavy.
Great jacamar, *Jacamerops aurea penardi*, p. 465
- Small; wing less than 90 millimeters; bill slender, with a thin, finely pointed tip 2
2. Upper surface and breastband shining metallic green; tail longer than wing, more than 88 millimeters.
Rufous-tailed jacamar, *Galbula ruficauda*, p. 459
- Upper surface and breastband dull greenish black; tail shorter than wing, less than 60 millimeters.
Salmon's jacamar, *Brachygalba salmoni*, p. 456

BRACHYGALBA SALMONI Sclater and Salvin: Salmon's Jacamar,
Barranquero Chico

FIGURE 55

Brachygalba salmoni P. L. Sclater and O. Salvin, Proc. Zool. Soc. London, October 1879, p. 535. (Río Nechí, Antioquia, Colombia.)

Small (body of sparrow size), with long, very slender, finely pointed bill; upper surface, breast, and sides faintly greenish black.

Description.—Length 165 to 180 mm. Ten rectrices; tail shorter than wing. Adult (sexes alike), above somewhat iridescent dull, dark oil green to greenish black, crown (especially the forehead) changing to dull brown; primaries and primary coverts black; sec-

ondaries tipped lightly with white or buff; throat and upper foreneck white, with a faint-to-heavy wash of buff or cinnamon-buff; breast, sides, tibia, and under tail coverts black with a sheen of iridescent green, the under tail coverts varying in some to cinnamon mixed with greenish black; abdomen cinnamon; under wing coverts dull black with a greenish sheen, spotted with cinnamon; a narrow light bar, varying from dull white to cinnamon across base of primaries. Birds in slightly worn plumage have the greenish sheen of the upper surface varied in part to bluish purple.

Juvenile, like adult but bill shorter; secondaries edged lightly with cinnamon-buff; lower back, crown, scapulars, rump, and upper tail coverts tipped narrowly with pale buff to cinnamon-buff; sides of throat tipped with cinnamon. The bill attains its maximum length slowly after the bird otherwise appears fully grown.

An adult male, collected at Pucro, Darién, January 30, 1964, had the iris bright red; bill black; tarsus and toes fuscous-black; claws black.

An adult female, taken at the same place, February 7, had the iris dark reddish brown. In a fully grown juvenile female the iris was gray. These two otherwise were like the adult male.

Measurements.—Males (10 from Darién and northwestern Colombia), wing 70.8-73.2 (71.9), tail 52.9-57.8 (54.4), culmen from base 46.4-49.4 (48.3, average of 8), tarsus 9.3-10.4 (9.9) mm.

Females (10 from Darién and northwestern Colombia), wing 70.8-74.0 (72.1), tail 52.2-56.4 (54.1), culmen from base 45.1-49.4 (47.2, average of 9), tarsus 9.2-10.1 (9.6) mm.

Resident. Local, rare, in the Tropical Zone of eastern Darién on the Río Jesucito, and in the valley of the Río Tuira (El Real, Tapalisa, Pucro, Boca de Paya, Cana).

The first record of this species for Panamá was 1 collected on June 3, 1908, at Cana by R. S. Williams of the New York Botanical Garden, who presented the bird to the U. S. National Museum. Subsequently, E. A. Goldman secured others there on February 20 and March 12, 1912, and I collected a male in the same general area but somewhat lower down on February 6, 1961. Others were obtained by W. B. Richardson in 1915 at El Real and Tapalisa. I found them on the Río Pucro in 1964, and on the Río Tuira near Boca de Paya in 1959.

In my few observations of this small jacamar I have seen them near streams where they rested in the sun in early morning in the top of small shrubs along the bank, or in the open branches of

guarumos above the lower forest growth. They have heavy bodies and short legs so that they rest with the feathers of the abdomen touching the perch, where they sit quietly with the neck drawn in, turning the head about. The extraordinarily slender, pointed bill appears almost as long as the body. As insects pass they fly out to seize them expertly in the air, and then return to the original perch. A juvenile female, with the bill only 31 mm. long was taken with an adult of the same sex at Pucro on February 7. Both had eaten small black bees. The stomach of one from Cana held fragments of small beetles, moths, and a wasp.

I have seen no record of the nest and eggs.

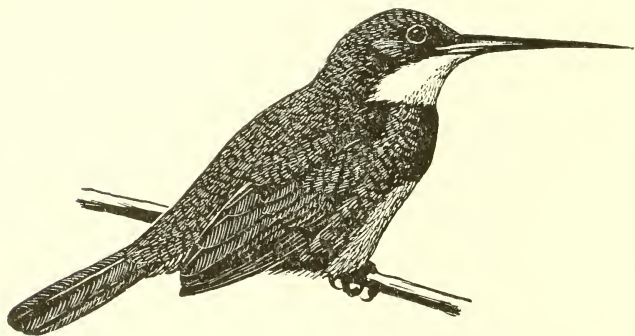


FIGURE 55.—Salmon's jacamar, barranquero chico, *Brachygalba salmoni*.

The species ranges in Colombia in northern Antioquia, Córdoba, and Bolívar. The most recent specimen records for Colombia are those of Dr. Jürgen Haffer, who collected male and female on the Río Guasdalito, a short distance south of Turbo, Antioquia, during geological studies in that area in 1958 and 1959 (Lozania, no. 12, December 21, 1959, p. 28). Later, in 1960 and 1961, he and Donald Beattie secured others on the slopes of the Serranía de San Jerónimo, west of El Carmen, northern Bolívar. From 3 males, 4 females and 1 juvenile bird taken there Haffer (Journ. f. Orn., vol. 103, no. 1, March 31, 1962, pp. 41, 43, fig. 4) named a new race *Brachygalba salmoni carmenensis* (type locality, upper Arroyo Camaroncito, 250 meters elevation, 20 kilometers west of El Carmen, Department of Bolívar; type adult female collected September 15, 1960, no. 6111, Instituto de Ciencias Naturales, Universidad Nacional de Colombia).

This he considered to differ from the nominate form in greater width of the white to buff band on the inner base of the primaries, greater extent of cinnamon "ockerfarben" on the under tail coverts, in white tips of the outer secondaries, and a slight curvature of the bill. The illustration shows the type of the new form and another of the same sex from northern Antioquia in lateral view, with the slight curvature (described as varying from 1 to 3.3 mm. from the straight axis) evident. As I have not seen the material I am not in position to judge the validity of the race. However, in the series from Panamá and farther west in Colombia that I have examined I find the color differences duplicated, and also in some a slight curvature in the bill, though not to the extent described for the new form.

The species was named for Thomas Knight Salmon, of England, resident from 1872 to 1878 in Medellín, Antioquia, who collected the first known specimens.

GALBULA RUFICAUDA Cuvier: Rufous-tailed Jacamar,
Tucuso de Montaña

Rather small, with long, very slender, narrowly pointed bill; upper surface and band across breast shining green; outer rectrices cinnamon-rufous.

Description.—Length 220-245 mm. Twelve rectrices, tail longer than wing, strongly graduated. Adult male, upper surface, including the two to four central rectrices, side of head and a broad band across lower foreneck and upper breast shining metallic golden green; outer rectrices on either side (the outermost short, nearly hidden by under tail coverts) rufous-tawny, with the hidden basal area in part, or entirely golden green like the central pair; primaries and secondaries dull black, the latter edged with metallic green; lores, band beneath eye, and anterior rectal area black; foreneck entirely white in one race, or with the chin black in another; rest of under surface, including the innermost under wing coverts, rufous-tawny; outer under wing coverts with the longer rows buff and the central area dull metallic green; inner webs of primaries and secondaries edged narrowly with buff at base.

Adult female, central foreneck cinnamon-buff; lower breast, abdomen, and sides dark cinnamon-buff (slightly paler than in male); otherwise like the male.

Juvenile, like the adult of the same sex; in young stages with the tip of the maxilla buff or dull yellow.

The species is one of wide range in northern South America. The race *melanogenia*, with black chin and the four central rectrices green ranges from western Chiriquí and western Bocas del Toro in Panamá north through Central America to southern México. Recently the nominate subspecies, in which the chin is white and only two central rectrices are green, has been recorded near El Real in Darién. These two, recognized now as geographic races, originally were considered closely related species. In pure form they differ distinctly in the number of dark-colored central rectrices, and in the color of the throat. The dark-chinned group, absent from the Isthmus except, as stated, in the far west near Costa Rica, is found again in western Colombia and western Ecuador. Where it meets nominate *ruficauda* in northwestern Antioquia the two hybridize through a narrow area, along the upper valleys of the streams that flow to the southeastern shores of Bahía Colombia south of Turbo. This has been described in detail by Jürgen Haffer (Amer. Mus. Nov., no. 2294, 1967, pp. 37-42). It should be noted that the collections made for the Smithsonian by M. A. Carriker, Jr., indicate a broader zone of hybridization than that described by Haffer as they include specimens of obvious intermediate character from Necolí to the north on the eastern side of the Golfo de Darién, and in Córdoba from the upper Sinú Valley at Nazaret and at Quebrada Salvajín on the Río Esmeralda a short distance above the point where that stream joins the Río Sinú.

GALBULA RUFICAUDA RUFICAUDA Cuvier

Galbula ruficauda Cuvier, Règne Anim., vol. 1, 1817 (December 1816), p. 420. (Guiana.)

Characters.—Two central rectrices metallic golden green; chin white.

Measurements.—Males (11 from Antioquia and Bolívar, northwestern Colombia), wing 78.7-82.4 (80.0), tail 99.1-114.2 (106.6), culmen from base 46.2-54.8 (50.0), tarsus 12.0-12.8 (12.3) mm.

Females (12 from Antioquia and Bolívar, northwestern Colombia), wing 77.3-84.6 (80.5), tail 94.0-104.6 (98.4), culmen from base 42.0-53.0 (47.7), tarsus 12.0-12.8 (12.3) mm.

Resident. Recorded in the lower Tuira Valley, Darién.

The only record for this race is of 3 living young taken April 3, 1966, from a nest burrow on the Río Pirre near El Real. The man who found them kept 1 (subsequent history not known); P. N. Slattery secured the others. One, a female, lived until April 10,

the other, a male, until April 13. Through the courtesy of Eugene Eisenmann I have examined the specimens now in the American Museum of Natural History. Both are well feathered with bill and tail only one-third or slightly less grown. In the rectrices the two central feathers are metallic green, the others cinnamon-rufous. The chin in the female is cinnamon-buff. The male had lost all the feathers in this area.

In the lower Río Atrato Valley in northwestern Colombia, Haffer (*loc. cit.*, p. 38) has recorded *ruficauda* at Sautatá, and on the Río Salagüí. Both localities are on the Caribbean slope, in Chocó, near the boundary with Panamá. The race ranges across central Colombia in the Cauca and middle Magdalena valleys to Venezuela where it is found north of the Orinoco (except in the northwest in the Maracaibo area), the Guianas, Trinidad, and Tobago, and south to the Rio Branco in northern Brazil. In Tobago and Trinidad, Belcher and Smooker (Ibis, 1936, pp. 795-796) report 2 to 4 eggs in the nest. In 2 sets of 3, presented to the British Museum (Natural History) by C. F. Belcher, taken at Valencia Road and Sangre Grande, Trinidad, May 24, 1931, the eggs are white, elliptical in form, with the shell smooth with a high gloss. Measurements of the 2 sets are as follows: 22.1×18.1 , 22.7×18.2 , 23.6×18.3 ; and 21.3×18.8 , 22.3×19.0 , 22.3×19.2 mm. In the account by Belcher and Smooker (*cit. supra*, p. 796) they mention that "we have twice seen lightly-spotted eggs of this species." Three eggs in the U. S. National Museum of the closely allied race *Galbula ruficauda brevirostris*, collected by M. A. Carriker, Jr., at Villa Felisa, 15 kilometers southwest of Cúcuta, Norte de Santander, Colombia, are finely and sparingly spotted with pale cinnamon.

GALBULA RUFICAUDA MELANOGENIA Sclater

G. [albula] melanogenia P. L. Sclater, in Jardine's Contr. Orn., no. 3, 1852, p. 61. ("South America" = Alta Verapaz, Guatemala.)

Characters.—Four central rectrices metallic golden green; chin black.

A male, collected at Puerto Armuelles, Chiriquí, February 17, 1966, had the iris Verona brown; bill black; tarsus dull honey yellow; toes grayish brown; underside of toe pads honey yellow; claws black.

Measurements.—Males (10 from Chiriquí and Bocas del Toro), wing 80.1-83.5 (81.4), tail 93.6-101.0 (99.3, average of 9), culmen from base 49.6-56.8 (54.0), tarsus 11.4-13.0 (12.5) mm.

Females (10 from Chiriquí and Bocas del Toro), wing 79.1-83.4 (81.1), tail 93.1-98.5 (95.4), culmen from base 47.5-53.6 (49.9), tarsus 12.0-13.6 (12.7) mm.

Resident. Local, in small number, in western Chiriquí, from sea level near David to 1,350 meters on Cerro Pando; found also in western Bocas del Toro.

The early definite records for this bird include specimens collected near David by Bridges (Sclater, Proc. Zool. Soc. London, 1856, pp. 139-140), and, 12 years or more later, by Arcé (Sclater, idem, 1870, p. 201) from Mina de Chorchá, Bugaba, and the southern slopes of Volcán de Chiriquí. W. W. Brown, Jr., (Bangs, Auk, 1901, p. 360) found them in some numbers near David and Divalá from October to December 1900, and at Bugaba in July 1901 (Bangs, Proc. New England Zool. Club, vol. 3, 1902, p. 32). There is a specimen in the California Academy of Sciences collected by Mrs. Davidson, December 25, 1930, near El Banco at about 1,000 meters elevation on the south slope of the volcano southwest of Boquete. Mina de Chorchá, east of David, is the most eastern point at which the bird has been recorded in Chiriquí.

In Bocas del Toro, Wedel secured a series at Guabo and Cricamola in 1928 (Peters, Bull. Mus. Comp. Zool., vol. 71, 1931, p. 317), and there is a specimen in the Havemeyer collection in the Peabody Museum at Yale taken at Almirante July 25, 1927, by Austin Paul Smith.

Skutch (Ibis, 1963, p. 354), in southwestern Costa Rica, found that these jacamars disappear from their breeding stations with cutting and other encroachment in their forest haunts, and apparently the same factors have greatly reduced their abundance in Panamá within recent years. The only modern records for Bocas del Toro are 2 from Almirante secured July 16, 1962, and February 7, 1964, by personnel of the Gorgas Memorial Laboratory. On the Pacific side Dr. F. A. Hartman secured 1 at 1,350 meters on the slopes of Cerro Pando, beyond El Volcán, February 23, 1949. I have made careful search for it in the area adjacent to Divalá, where formerly it was common, without success until 1966, when on February 17 I found a few in a small tract of forest in the region known as Olivo, about 10 kilometers northeast of Puerto Armuelles, and on February 25, 1 at Punta Balsa, near the southern end of the Burica Peninsula. At Olivo I saw them resting quietly on open perches in undergrowth in heavy shadow under tall forest trees. The specimen found at Punta Balsa was in a similar area in a forested quebrada.

Because of the iridescent plumage and the long, very slender bill many persons think of this jacamar as a large kind of hummingbird, as is indicated by the common name in Guatemala of *gorrión de montaña*, and of *tucuso de montaña* in Venezuela (*gorrión* and *tucuso* being names applied to hummingbirds in these countries). Skutch (Auk, 1937, pp. 135-146; Ibis, 1963, pp. 354-368) has written two detailed accounts of the life history of this subspecies. He describes the call as a single rather sharp note, often varied in tone, that may be repeated rapidly as a musical, trilling song. The nest is a burrow excavated in some more or less vertical earthen surface, as a steep-faced bank that may be less than half a meter high, or placed sometimes in the elevated masses of earth that adhere to the vertical roots of fallen trees. He writes that seven burrows measured in Costa Rica varied from about 29 to 41 centimeters ($11\frac{1}{2}$ to 16 inches) in length by about 40 millimeters ($1\frac{3}{4}$ inches) in diameter. They were dug in the dry season in February, though eggs were not laid until later, from March to June. During incubation, a period that varied from 19 to about 23 days, male and female alternated in the nest through the day, with the female in attendance during the entire night. Young when hatched were well covered with rather long filaments of white down.

Jacamars are expert flycatchers, being one of the relatively few birds that capture and eat butterflies regularly. These, if large, are beaten on a perch to break off the wings. Smaller kinds are fed entire to the young. Large dragonflies, beetles, diptera, and bees are included in the food. Masses of hard chitin are regurgitated by parents in the nest chamber, where the eggs are laid on the bare earth, and accumulate through the period of development of the young. Though there is no nest sanitation, plumage of the young remains clean.

Skutch recorded sets of 2 and 3 eggs in Costa Rica, and 2 sets of 4 each in Guatemala. In one nest in the latter locality he found "four small, pure-white eggs which were nearly round and appeared quite fresh, for the shells were somewhat translucent and the yolks shone through. . . . They measured: 22.2×19.1 , 22.2×19.1 , 22.2×19.4 and 23×19.8 millimeters."

The bill in these jacamars while long, with a very slender, attenuated tip is hard and strong. Wear is seldom evident from their work in digging nest burrows, which, however, are excavated in clay or other soil that usually is not too hard. The report by Medina Padilla (Bol. Mus. Cienc. Nat., Caracas, vol. 1, 1955, p. 198) of a nest in a burrow in a termitarium may perhaps have been an instance when the jacamar

used a shelter dug by some other bird, as the exposed nests of termites externally are extremely hard.

Sclater, in his original description of *Galbula melanogenia* in 1852, in Jardine's *Contributions to Ornithology*, wrote "I have purchased from Mr. Leadbeater the only two examples of this new species that I have yet seen. They are ♂ and ♀, and from their appearance, I have little doubt were prepared by no other hand than that of M. Delattre, but in what part of the vast continent of South America he collected them it is impossible to say." Immediately afterward, in part 5, page 93 of the same volume Sclater added that Jardine, editor of the journal, had informed him that he had a specimen of the bird sent from "Veragua . . . by Mr. Gould's collectors." And Sclater in his privately published synopsis of the Galbulidae (1853, p. 3) includes *melanogenia* with "Habitat, Veragua, Central America." In that early day Veragua included all of the western area of the Isthmus, a matter often not understood. In the case of this jacamar, through this misunderstanding the type locality has been listed as the modern Province of Veraguas, where the bird has not been found. Sclater later (Mon. Jacamars and Puff-birds, pt. 1, October 1879, p. 19) said of his two specimens that they were "probably obtained in Vera Paz, where Delattre was one of the earliest explorers." Following this (Cat. Birds Brit. Mus., vol. 19, 1891, p. 167) he lists the two, now in the British Museum, as follows: "Vera Paz (*Delattre*) Sclater Coll. (Types of the species.)" Delattre, according to Griscom (Bull. Amer. Mus. Nat. Hist., vol. 64, 1932, p. 5), came to Guatemala in 1842, and was there for nearly a year, with Cobán, Alta Verapaz, as his base. It seems appropriate to accept Sclater's statements, and to cite Alta Verapaz, Guatemala, as the restricted type locality.

A population assigned also to *melanogenia* ranges from northern Chocó in western Colombia south near the Pacific coast into western Ecuador. Chapman (Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 337, and vol. 55, 1926, p. 352) found that these birds, compared with those of Central America, are "somewhat smaller and with the rufous areas darker," but did not consider that the differences were distinctive enough to warrant separation by name. From examination of 15 specimens collected recently in northwestern Colombia I agree with this conclusion. It is possible that birds of this group may extend north into Darién, as they have been found at Juradó only about 20 kilometers from the boundary with Panamá. Measurements of this southern group are as follows.

Males (11 from western Colombia and Ecuador), wing 78.1-84.9

(80.8), tail 89.5-100.0 (95.1), culmen from base 40.0-54.6 (47.9), tarsus 11.0-13.2 (12.2) mm.

Females (10 from western Colombia and Ecuador), wing 77.5-83.3 (80.8), tail 85.3-96.8 (90.1), culmen from base 39.3-50.0 (45.1, average of 9), tarsus 11.7-13.4 (12.5) mm.

JACAMEROPS AUREA PENARDI: Bangs and Barbour: Great
Jacamar, Barranquero Grande

FIGURE 56

Jacamerops aurea penardi Bangs and Barbour, Bull. Mus. Comp. Zoöl., vol. 65, September 1922, p. 200. (Carrillo, Costa Rica.)

Largest of its family in Panamá; with broad, flattened bill; metallic blue to golden green above and on throat; breast and abdomen rufous.

Description.—Length 275-295 mm. Bill broad, flattened and slightly decurved; nostril rounded; tarsus feathered for upper half or more. Adult male, crown shining metallic green, the forehead and forecrown often bright bluish green; rest of upper surface, including wing coverts, secondaries and central rectrices brilliant metallic green, with the upper back varied to golden or copper-green; outer rectrices dark blue or violet-blue; primaries black, with a sheen of blue; chin dull black; upper throat and sides of neck shining metallic green; center of foreneck white; rest of under surface rufous to tawny; under wing coverts cinnamon-buff.

Adult female similar, but somewhat paler rufous below, with the foreneck entirely rufous, like the rest of the under surface (but usually with concealed bases of the feathers white).

Male and female, collected at El Llano, Panamá, February 9, 1962, had the iris chestnut-brown; bare skin of lores, edge of eyelids, and around eye dusky neutral gray; bill black; inside of mouth and center of base of tongue dull honey yellow; tip of tongue fuscous; bare lower end of tarsus and toes dull green; claws black.

Measurements.—Males (10 from Panamá and Córdoba, northwestern Colombia), wing 104.5-114.0 (110.8), tail 124.7-135.5 (130.5), culmen from base 49.4-54.6 (51.4), tarsus 13.4-15.0 (14.3) mm.

Females (10 from Panamá, and Chocó, Antioquia, and Córdoba, northwestern Colombia), wing 104.6-114.1 (111.1), tail 117.6-127.0 (122.3), culmen from base 45.5-50.6 (48.0), tarsus 13.1-14.6 (14.0) mm.

Resident. Uncommon in forested areas of the Tropical Zone. On the Pacific slope from the Río Pacora in eastern Province of Panamá eastward through Darién; to 550 meters on Cerro Pirre, and 575

meters on the Río Tacarcuna. On the Atlantic slope throughout from western Bocas del Toro to eastern San Blas, including the lower Chagres Valley.

Three specimens marked as collected by Arcé, 1 in the British Museum and 2 in the U. S. National Museum, labeled "Veragua" without other data are of doubtful locality. If correctly attributed to Arcé they may have been taken on the Atlantic slope of Veraguas. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, p. 509) list specimens received from McLeannan in what became the Canal Zone, and then add "we have a skin from our collector Arcé from a

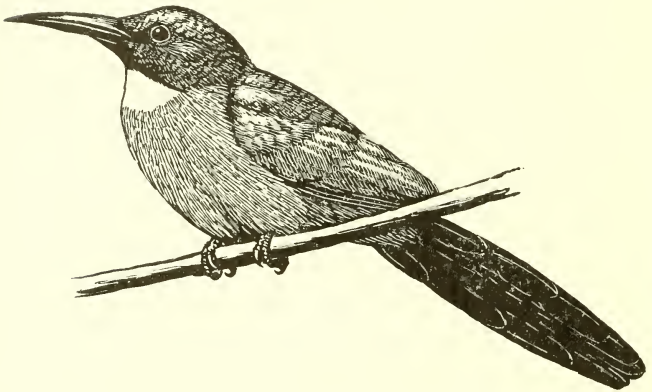


FIGURE 56.—Great jacamar, barranquero grande, *Jacamerops aurea penardi*.

point westward of the railway." The 2 in Washington, which were received from the dealer Boucard, from their appearance may have come from McLeannan rather than from Arcé.

In my few encounters with these birds I have found them resting quietly among leaves in the top of undergrowth or, where the forest was not too tall, on open perches below the lower tree crown. Here my eye has detected them through the reflection of light from the metallic sheen of the plumage of the head and back. Usually they were in pairs. In those instances when I saw only one I was quite sure that the other was somewhere near, concealed in the forest cover. Once, in Darién, my attention was attracted to one by its high-pitched whistled call, slowly given with the tip of the bill barely

open. Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, pp. 177-178) reports variations from this to "two-parted and two-leveled" notes. He records also that they fly out like motmots to seize insect prey among leaves, rather than flycatching in open air like the smaller species of the family.

Their food so far as recorded is taken from a variety of insects. One collected by E. A. Goldman at Cana had the stomach filled with fragments of 4 or more kinds of beetles. Others that I have examined had eaten lepidoptera and shining green, wasplike hymenoptera.

This species, like the large motmots, is often called *Juró*.

The race found in Panamá and northern and western Colombia was named to honor Thomas E. Penard, a collaborator of the Museum of Comparative Zoology, in recognition of his studies of neotropical birds.

Family BUCCONIDAE: Puffbirds; Bucónidas

The birds of this family, of 30 or more tropical American species, are found in forested areas from southern México south through Central America and South America to northern Argentina. While they vary from those of sparrow size to others that are as large as jays, all have rather heavy bodies, short legs, and short tails, with rounded wings. The majority are birds that rest quietly on open perches on watch for insects or larger food. Their feathers are long, soft and lax, moulded loosely to the body, from which has come the group name of puffbird. Like their relatives the jacamars they nest in burrows that they dig in earthen banks, or in nests of termites elevated in trees. Most have wheezy voices heard rather rarely. An exception is found in the gray and black nunbirds, largest in the family, that have a variety of loud calls, often uttered by several in company.

While related to the jacamars they differ decidedly in more somber plumage, and in the strong bristle feathers around the mouth. It was long believed also that puffbirds lacked the aftershaft on the contour feathers of the body, present in the other family. But in a recent study Sibley (Wilson Bull., 1956, p. 252) has found that a group of about 12 slender barbs that arise separately from the proximal margin of the superior umbilicus are homologous to the fully formed aftershaft of the jacamars.

KEY TO SPECIES OF BUCCONIDAE

1. Breast and abdomen gray, bill orange-red; larger, wing 130 mm. or more.
White-fronted nunbird, *Monasa morphoeus*, p. 486
Breast and abdomen not plain gray, bill black or dull colored; smaller, wing 120 mm. or less 2
2. Under surface white; heavily streaked with black, or with a single narrow black band across breast 3
Under surface mainly buff or cinnamon 6
3. Entire under surface streaked heavily with black.
Lanceolated monklet, *Micromonacha lanceolata*, p. 483
A single black band, narrow or broad, across the breast 4
4. Hindneck wholly black, scapulars with a white spot, tail spotted with white; small, bill more slender and less than 25 mm. long.
Pied puffbird, *Notharchus tectus subtectus*, p. 473
A white collar on hindneck, tail without white spots; larger; bill broad and heavy, more than 30 mm. long 5
5. Forehead and sides of neck white; larger.
White-necked puffbird, *Notharchus macrorhynchos hyperrhynchus*, p. 468
Forehead black, like crown; black of lower surface extensive covering side of neck, breast, and lower foreneck.
Black-breasted puffbird, *Notharchus pectoralis*, p. 471
6. Color pattern plain, without bars, spots, or streaks; small, wing not more than 60 mm.
Gray-cheeked nunlet, *Nonnula frontalis stulta*, p. 484
Plumage variegated with bars, spots or streaks 7
7. Upper surface barred heavily with black; feathers of rectal area normal.
Barred puffbird, *Nystalus radiatus*, p. 476
Spotted lightly with buff on back and wings; feathers of rectal area white, narrow, pointed and distinctly elongated.
White-whiskered puffbird, *Malacoptila panamensis*, p. 479

NOTHARCHUS MACRORHYNCHOS HYPERRHYNCHUS
(Sclater): White-necked Puffbird; Martín del Monte

FIGURE 57

Bucco hyperrhynchus Sclater, Proc. Zool. Soc. London, pt. 23, 1855 (January 22, 1856), p. 193, pl. 105. (Upper Amazon.)

A heavy-bodied, short-tailed bird with strong bill, white forehead and under parts; with a broad black band across breast.

Description.—Length 235-255 mm. Bill thick and heavy. Adult (sexes alike), lores, crown, and upper back black to slate-black; rest of upper surface, including wings and central rectrices, blackish slate; lateral rectrices very dark gray, all tipped narrowly with white; wing coverts, secondaries, back, rump, and upper tail coverts tipped very narrowly with white; forehead, broad line over eye, band across hindneck, foreneck, side of neck, upper breast, abdomen, and under

tail coverts white; feathers of side of jaw and neck edged very narrowly with black or slate, producing indistinct bars, these markings sometimes present also on hindneck, but faintly; a broad black band across breast; flanks slate-gray, barred lightly with white; edge of wing and under surface of primaries at base white; under wing coverts white toward body, outer area black.

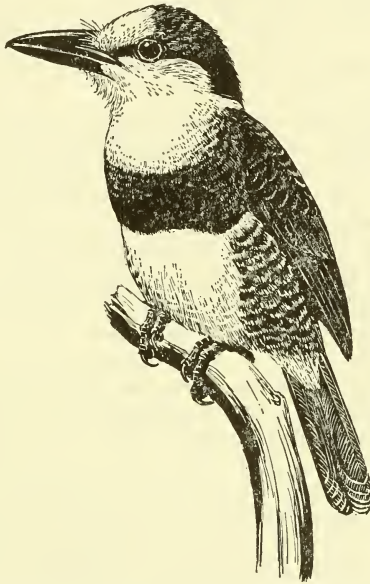


FIGURE 57.—White-necked puffbird, martin del monte, *Notharchus macrorhynchos hyperrhynchus*.

A male, taken at Juan Mina, Canal Zone, January 10, 1961, had the iris bright reddish brown; bill black; tarsus, toes, and claws dusky neutral gray, with narrow lines of dull white separating the scutes. Another male, from Cañita, Panamá, February 8, 1962, had the iris dark red; bare eyelid grayish white; tarsus and toes dark neutral gray; claws black. Inside of mouth in both black.

A female, collected at Puerto Armuelles, Chiriquí, January 30, 1966, had the iris bright red; bill black; inside of mouth, and both

upper and under sides of tongue deep black; tarsus dark neutral gray; toes fuscous-brown; scutes of tarsus and toes outlined in dull white; claws black.

Measurements.—Males (21 from Panamá), wing 108.5-115.9 (111.7), tail 77.8-87.2 (81.7), culmen from base 38.6-50.0 (43.4), tarsus 19.0-21.0 (19.9) mm.

Females (15 from Panamá), wing 111.0-119.0 (114.4), tail 80.0-89.0 (83.5), culmen from base 40.7-48.0 (43.4), tarsus 19.4-21.0 (20.4) mm.

Resident. Widely distributed in the tropical lowlands throughout the Republic.

As the white-necked puffbird lives in areas of rather open forest it is absent through the broad expanses of savanna in the western area of the Pacific slope, though it ranges along their borders. I found it near Parita in Herrera, but it seems to be rare in the southern end of the Azuero Peninsula as it was not seen to the south in Los Santos. On the Atlantic side it ranges throughout, including the San Blas, where it has been collected at Bahía Caledonia (specimens in the Los Angeles County Museum taken in April 1939) and at Permé. It is not found on the offshore islands.

These birds rest quietly on open perches above the undergrowth or in the open on forest edge, turning the head to watch for insect prey. When such food is seen they fly out to seize it from leaves or twigs, often at distances of 25 or 30 meters. Usually the prey is brought back to the original perch, where it is beaten on the branch before being swallowed. Birds that I examined had eaten many beetles and orthoptera. At Puerto Armuelles I noted especially that they were taking a large, shining green scarabaeid, identified in our Department of Entomology as *Macraspis lucida* Oliv., a species present in abundance in the high tree crown, taken also by other large insect-eaters. On Barro Colorado Island, R. A. Johnson found these puffbirds occasionally watching near raiding swarms of ants, on the alert to seize fleeing insects which were caught in the air and then brought back to a perch to be killed by beating.

In early morning puffbirds often are found resting in the sun, the open branches of the guarumo (*Cecropia*) being especially favored. Along the coast I encountered them occasionally on the landward side of taller growths of mangroves. I was told that their eggs were placed in burrows dug in arboreal nests of termites, but did not observe this personally. From February to July birds usually show

wear on the tips of wing and tail feathers, indication that they are occupying nest cavities.

As they rest on their high perches both males and females occasionally utter a series of low, twittering notes that blend in fairly rapid repetition into a trilling song. To the ear of one familiar with northern birds this is quite similar to the song of the pine warbler. The sound is so insignificant compared with the stocky form of the bird that when I first heard it I did not trace it immediately to its proper source, though the songster rested in clear view, but instead looked for some smaller species in the undergrowth.

In the preparation of specimens, where the gonads of males were somewhat developed I noted that the left one was definitely larger than the right. In one instance it measured 7 mm. long by 5 broad, with the companion only about 5 by 3 mm. In another, the right gonad was 5 mm. long by 3 broad, while the left was only one-third as large in bulk.

Countrymen have a variety of names for this species, in addition to the usual *martín del monte*. Boys with slingshots often called it *cabeza piedra* because of its definite strength against these usually lethal weapons. In Darién it was sometimes the *aguanta piedra*, less often the *correrío*. One hunter who accompanied me often at La Jagua, near Pacora, called it *catinga*.

The name *hyperrhynchus* now covers the birds of this species over most of Central America, Colombia, Ecuador, and Venezuela south to northwestern Brazil. The typical form *macrorhynchus*, found in eastern Venezuela from eastern Bolívar, the mouth of the Río Orinoco, and the Guianas south to northern Brazil (west to the Rio Branco) differs in much narrower white band on the forehead. The somewhat grayish population with rump and upper tail coverts faintly barred with white of El Salvador and northwestern Nicaragua has been described as the race *cryptoleucus* by van Rossem.

**NOTHARCHUS PECTORALIS (G. R. Gray): Black-breasted
Puffbird; Martín Pechinegro**

Bucco pectoralis G. R. Gray, Gen. Birds, vol. 1, December 1846, pl. 26. (South America = Middle Magdalena Valley, Colombia.)

Like the white-necked puffbird but smaller, with black forehead; black of breast extended on side of neck and cheeks to the bill.

Description.—Length 210-235 mm. Adult (sexes alike), crown, hindneck, upper back, breast, and side of neck glossy blue-black, in some with a slight greenish sheen; lower back, rump, upper tail

coverts, and wings dull slate, tipped and edged narrowly with white; throat, auricular region, indistinct line across hindneck, abdomen, and under tail coverts white; flanks slate-gray, tipped and barred with white; base of primaries on under surface white; distal under wing coverts dark gray; proximal series black; edge of wing white.

Specimens in the American Museum of Natural History from Bulúm and Carondelet, Ecuador, taken by G. Fleming, have the following data: iris brown or dark brown; bill black; "feet" blackish or gray.

Measurements.—Males (10 from Panamá and Colombia), wing 96.1-100.3 (98.3), tail 77.2-85.6 (80.9), culmen from base 34.0-39.8 (36.1), tarsus 18.2-19.0 (18.7) mm.

Females (14 from Panamá and Colombia), wing 95.0-103.2 (98.2), tail 72.2-83.8 (79.1), culmen from base 34.1-37.7 (36.0), tarsus 16.6-18.2 (17.4) mm.

Resident. Found in forested areas; in the Canal Zone through the lower Chagres Valley; on the Pacific slope from western Canal Zone east through eastern Province of Panamá and Darién.

Knowledge of the occurrence of this species in Panamá began with the work of McLeannan, who sent specimens to Lawrence in New York about 1861. About 2 years later others came to Sclater, and to Salvin, in London. Goldman collected a female near Lion Hill, January 18, 1911, and Hallinan (*Auk*, 1924, p. 313) secured 1 on the Río Caimitillo, back of Miraflores Lake, October 20, 1915. In later years it has been found regularly on Barro Colorado Island. On April 4, 1954, at Farfan Beach, Canal Zone, a pair came into the top of a dead tree, and remained peering about for some time. When they flew several yellow-green vireos attacked them violently. On January 9, 1960, I recorded 1 in a guarumo standing in the open in the forest reserve back of Gamboa.

The first record for eastern Panamá is of 1 sent to Salvin by Arcé, taken near Chepo in 1864. March 10, 1950, I collected 1 in heavy forest at 300 meters elevation on Cerro Chucantí. And on March 27, secured 2 males, and saw another individual in the forest at Charco del Toro on the Río Majé.

In Darién, an Indian brought 1 to Thomas Barbour on the Río Esnape, April 3, 1922. Bond and De Schauensee (*Acad. Nat. Sci. Philadelphia*, Mem. 6, 1944, p. 31) recorded 1 from Cerro Sapo. On the Río Jaqué, April 4, 1947, I found 1 in early morning resting in the sun in a tall tree top.

As the bird lives in heavy forest, usually in the tree crown, and has

the same habit of perching quietly as the larger species, it is probably more common than this summary of the few known records indicates.

Their food of insects includes beetles and orthoptera, seized from branches or leaves. The bird then returns to a perch, often the one from which it had flown, beats the insect on the branch, and swallows it.

Skutch (Wilson Bull., 1948, pp. 81-89) on Barro Colorado Island, watched a pair while they dug a nest burrow in the side of a large termite nest, located about 10 meters from the ground in a small tree that grew beside an opening in second-growth forest. Excavation of the nest hole, begun March 28, proceeded slowly, with both male and female working at it for short periods, as it was not completed until about April 10. When finished it was about 180 mm. deep by 48 in diameter (7 inches by $1\frac{7}{8}$ inches). The first egg was found April 23, with others at 2-day intervals until 3 were laid, all pure white in color. This first setting was destroyed, but the birds occupied the nest hole again, as a second set of 3 was found on May 30. Both sexes shared in incubation. He noted the voice as "low, whispered peeps . . . and a nasal sound uttered when they were disturbed at the nest."

**NOTHARCHUS TECTUS SUBTECTUS (Sclater): Pied Puffbird,
Juancito Negro**

FIGURE 58

Bucco subtectus P. L. Sclater, Proc. Zool. Soc. London, pt. 28, August 1860, p. 296. (Esmeraldas, Ecuador.)

In color pattern like the white-collared and black-breasted puffbirds, but of sparrow size; forecrown and tail spotted with white, and a white spot on each side of the back.

Description.—Length 140-155 mm. Adult (sexes alike), upper surface and side of head black, changing to slate on the rump; crown spotted with white (in varying amounts); lores and line over eye white; scapulars tipped broadly with white to form a spot on either side; upper tail coverts tipped and barred lightly with white; wings slate-black, with primaries and outer secondaries edged narrowly with white; rectrices black; central pair tipped narrowly with white, others barred broadly and tipped widely on inner web with white; under surface white, with a black breastband, somewhat variable in width; flanks slate, tipped indistinctly with white; under surface of primaries and secondaries proximally white; longer under wing coverts slate; others and edge of wing white, mottled faintly with black.

Immature, brownish black above, with greater wing coverts and inner secondaries tipped with white; outer rectrices brownish gray, tipped and barred with white.

According to Jewel, in females taken at Gatun, Canal Zone, the iris was brown, bill black, feet blue-black (Stone, Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, p. 258.)

Measurements.—Males (13 from Panamá), wing 66.0-71.5 (67.9), tail 50.0-55.2 (53.1), culmen from base 21.8-24.9 (23.1), tarsus 13.1-14.7 (13.8) mm.

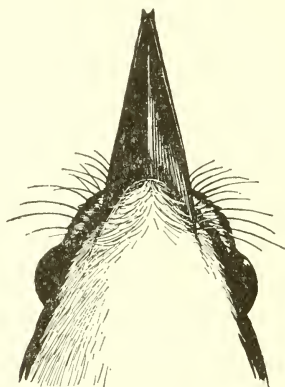


FIGURE 58.—Head of pied puffbird, juancito negro, *Notharchus tectus subtectus*, to show notched tip of maxilla.

Females (10 from Panamá), wing 66.0-71.8 (69.7), tail 52.4-58.5 (53.3), culmen from base 22.7-24.5 (23.4), tarsus 13.0-14.0 (13.3) mm.

Resident. Found locally in the forested lowlands in Bocas del Toro, and from the Chagres Valley (including the Canal Zone) eastward to the Colombian boundary; on the Pacific slope from the Río Majé, eastern Province of Panamá, east through Darién. It is probable that the bird will be found in Caribbean forests in northern Veraguas, Coclé, and western Colón.

This puffbird, described in 1860 from northwestern Ecuador, from a specimen collected by Fraser, was found the following year by McLeannan on the Atlantic slope of Panamá along the line of the Panama Railway. Specimens were sent to Lawrence, and came later

to Salvin and Sclater. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, March, 1896, pp. 513-514) mention these records, and also include "Veraguas (Arcé)" saying only that "Arcé found it a little further along the Isthmus." Sclater (Mon. Jacamars and Puffbirds, 1882, p. 83) explains in more detail that, "In 1876 Mr. Salvin received a single skin . . . from his collector Arcé, then in Veragua." The specimen, now in the British Museum has no data except the locality, which implies that it came from the Pacific slope where the bird has not been found in western Panamá. The report requires verification as there was confusion in a few instances between specimens forwarded by Arcé and McLeannan.

In appearance the pied puffbird duplicates in miniature the general pattern of black-and-white color of the two larger species. Like them it is a bird of the forests, where undoubtedly it is frequently overlooked because of its quiet activities. Little is known of it except for the few specimens that have been collected. Most of those previously recorded from the Republic have come from the lower Chagres River Valley. It has been found at intervals on Barro Colorado Island, where Chapman (My Tropical Air Castle, 1929, pp. 62-63) described an incident where one swung to hang briefly beneath its perch, when startled by a soaring turkey vulture. And then, when the vulture had passed, returned to its usual upright position. In February 1961, I obtained 3 near the Peluca Hydrographic Station, on the Río Boquerón. In Bocas del Toro, von Wedel secured 1 at Almirante November 1, 1928 (Peters, Bull. Mus. Comp. Zool., vol. 71, 1931, p. 317). Two others from this locality were sent to me from collectors of the Gorgas Memorial Laboratory, taken January 25, 1961, and November 20, 1962. In San Blas, I found 1 at Mandinga, and von Wedel secured several at Puerto Obaldía in 1930 and 1931 (Griscom, *idem*, vol. 72, 1932, p. 340).

On the Pacific slope we secured 1 at Charco del Toro on the Río Majé on March 20, 1950, the most western record to date on that side of the Isthmus. The George Vanderbilt Expedition of 1941 secured 1 at Garachiné (Bond and De Schauensee, Acad. Nat. Sci. Philadelphia, Mem. 6, 1944, p. 31). Benson collected a female at El Tigre on the Río Cupe, (near Boca de Cupe) on February 10, 1928 (in the Museum of Comparative Zoology). My records include 1 at Boca de Paya on the Río Tuira, March 13, 1959, and 1 at Jaqué, March 30, 1946. I have found them at the borders of forest, usually along streams, where they have come out to rest on open branches.

Here they perch quietly like the larger species, inconspicuous because of their small size. They eat small insects that they fly out to pick from leaves or branches. I have recorded the voice as low, soft call notes.

On the Caribbean slope this race of the pied puffbird ranges to northeastern Costa Rica in the Sarapiquí lowlands. To the south it extends across northern Colombia to the middle Magdalena Valley, and south in western Colombia to northwestern Ecuador. Typical *N. t. tectus*, found from southern Venezuela to northeastern Brazil, differs in much broader black band on the breast, in the entire crown spotted with white, and in slightly larger size.

NYSTALUS RADIATUS (Sclater): Barred Puffbird, Bobito Rayado

FIGURE 59

Bucco radiatus P. L. Sclater, Proc. Zool. Soc. London, pt. 21, 1853 (November 14, 1854), p. 122. (Magdalena Valley, Colombia.)

Bucco fulvidus Salvin and Godman, Biol. Centr.-Amer., Aves, vol. 2, March 1896, p. 514. (Veraguas, Panamá.)

Medium size; varying in color from cinnamon-buff to rufous, barred with black, heavily above, more lightly below.

Description.—Length 205-220 mm. Two color phases, one paler, one darker. Adult (sexes alike), crown russet, broadly barred with black, with a black band, in some indistinct, across the nape; a collar of light or dark buff on the hindneck; rest of upper surface, including wing coverts, secondaries, and tail, light cinnamon-buff to tawny, barred heavily with black; primaries rufous, tipped and barred variably with dusky; lores, side of forehead, and chin white; under surface buff to cinnamon-buff, barred irregularly and narrowly with black except on the under tail coverts; in some with upper foreneck and abdomen also immaculate, or nearly so; under wing coverts and inner webs of wing feathers ochraceous-buff, except on the ends of the longer primaries.

Immature, white to pale buff on the forehead, collar on hindneck, and under surface; some with the barring reduced.

Specimens in the National Museum and the American Museum of Natural History collected by Heyde and Lux at Capira, western Panamá Province, and Cascajal, Coclé, have the eye color marked as yellow or light yellow.

Measurements.—Males (10 from Panamá and Colombia) wing 86.9-92.4 (89.7), tail 70.5-77.2 (73.6, average of 9), culmen from base 30.5-35.2 (32.8), tarsus 16.7-19.8 (18.4) mm.

Females (10 from Panamá and Colombia), wing 88.8-94.0 (91.3), tail 72.8-81.6 (77.2), culmen from base 31.7-36.4 (33.4), tarsus 17.4-19.4 (18.3) mm.

Resident. Found locally in forested areas, on the Atlantic slope from the Río Coclé del Norte and El Uracillo, northern Coclé, east through the lower Chagres Valley (formerly, no recent record) and San Blas to Colombia; on the Pacific side reported from Capira, western Province of Panamá, and at Garachiné, the Río Tuira-Chucunaque Valley, and Jaqué, in Darién; to 600 meters on Cerro Pirre. (Early records from "Veragua," cited by some as Veraguas, are uncertain.)

The barred puffbird was reported first from Panamá by Sclater (Mon. Jacamars and Puff-birds, 1882, p. 110) who listed 2 specimens, 1 from his own collection marked "Panama," and the other in the Salvin and Godman collection from "Veragua (Arcé)." He remarked that the bird "extends northwards into the Panamanic isthmus; Mr. Salvin's collector Arcé obtained specimens in Veragua." In another place (Cat. Birds Brit. Mus., vol. 19, 1891, pp. 192, 193) he cited it from "Veragua," and listed a specimen under that locality from the Salvin-Godman collection. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, March, 1896, p. 515) who include the species as from "Veraguas (Arcé), Lion Hill (*McLeannan, in mus. G. N. Lawrence*)" add that the inclusion of the "State of Panama rests on specimens sent by Arcé in his later collections made at some place west of the Line of Railway," and further that McLeannan had sent a pair to Lawrence which Salvin saw in New York in 1874 (see Ibis, 1874, p. 315).

A skin in the U.S. National Museum, secured from Boucard, bears a stamped Museum Boucard label, on which is written "Col. Arce Veragua," and another slip on which Boucard had written the name of the bird and "Panama 1875." This specimen has the appearance of one prepared by McLeannan. In the Rothschild collection in the American Museum of Natural History there is a specimen collected by Heyde and Lux, labeled Capira, Panamá, February 3, 1888. This is the only report with full data from the Pacific slope west of Darién.

In Darién the George Vanderbilt Expedition of 1941 obtained 1 at Garachiné. Goldman secured 2 males and 4 females at 600 meters on Cerro Pirre in 1912, and Benson took others there in 1928. From January 30 to February 5, 1961, I saw and heard them occasionally around our camp at 450 meters on the slope of this mountain. They

were fairly common at the mouth of the Paya on the Tuira, and near the mouth of the Río Tuquesa on the Chucunaque in February and March 1959. P. L. Slattery shot a female at Yaviza in 1966. My first specimen was collected at Jaqué, April 9, 1946. From the Caribbean slope there is 1 in the National Museum, taken February 13, and 1 in the American Museum of Natural History, taken February 28, 1889, by Heyde and Lux in the region known as Cascajal, on the Río Coclé del Norte in northern Coclé. February 25, 1952, I collected 1 at El Uracillo on the Río Indio, also in northern Coclé.

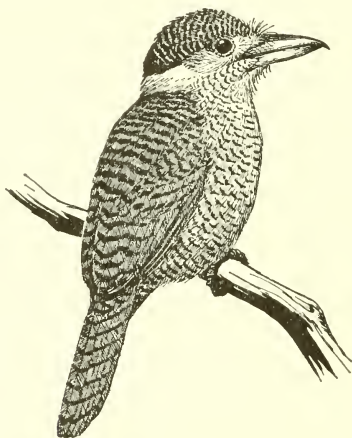


FIGURE 59.—Barred puffbird, bobito rayado, *Nystalus radiatus*.

In eastern San Blas, H. von Wedel secured several at Perné and Puerto Obaldía.

I have found these birds in forested country, but in the more open areas bordering streams, over trails, or sometimes on open flats covered with thickets of guayava. They rest quietly, often hidden by leaves where it is difficult to locate them. Their usual call is a double-noted whistle given slowly, a perfect imitation of the "wolf whistle," popular as a greeting in admiration of passing ladies!

Stomachs of specimens that I have examined have been filled with finely ground bits of beetles, jaws, and other remains of orthoptera, and the skins of large caterpillars. I have found no record of nesting.

Slater's type specimen, in the British Museum, a bird in the light

color phase, is labeled "Bogota, Williams, 1847." The author in the original description listed this as "Nova Granada." Chapman (Bull. Amer. Mus. Nat. Hist., vol. 36, 1917, p. 341) appropriately designated the Magdalena Valley, Colombia, as the restricted type locality.

The name *Bucco fulvidus* of Salvin and Godman cited above, based on their specimen labeled "Veragua (Arce)," is merely the dark phase of this species.

To the south the barred puffbird ranges across northern Colombia to the middle Magdalena Valley. On the west it extends south to Ecuador.

MALACOPTILA PANAMENSIS Lafresnaye: White-whiskered Puffbird, Bobito de Bigote

FIGURE 60

Medium size, dark coloration; spotted finely above, streaked rather heavily below; with white, elongated feathers on base of mandible.

Description.—Length 180-200 mm., a short, rounded bushy crest; two slightly differing color phases, one rufescent, one grayer, the latter in some less heavily streaked. Adult male, above brown to chestnut-brown, with feathers tipped with spots of buff to tawny except on rump, this marking changing to narrow streaks on forehead; some with feathers of forehead basally white; tail chestnut-brown; primaries and secondaries grayish brown, edged with rusty brown; space around eye tawny; side of head and neck brown, streaked with tawny; elongated, pointed feathers on base of mandible white, sometimes mixed with tawny; foreneck and upper breast tawny to tawny-buff; rest of under surface buffy white, with feathers on breast and sides edged with dusky, brown, or tawny, forming prominent streaks; abdomen buffy white; under tail coverts buff; inner webs of basal half of primaries ochraceous-buff; under wing coverts and edge of wing tawny.

Adult female, similar to male but less rufescent; above olive to brown, grayer on crown; throat, breast, and under tail coverts buff to cinnamon-buff; abdomen white; basal area of inner webs of under surface of primaries and under wing coverts paler.

Juvenile, more heavily streaked on under surface of body.

This species of puffbird is widely distributed in the tropical lowlands of Central America, from Tabasco and Chiapas in southern México through Central America and the Isthmus of Panamá to northwestern South America, where it ranges through northern Colombia east to the eastern edge of the middle Magdalena Valley in

Santander, and through western Colombia to western Ecuador. Two of the five geographic races now recognized are found in Panamá.

This is the most widely distributed species of its family in the Republic, being found wherever there is forest, except in the higher mountains.



FIGURE 60.—White-whiskered puffbird, bobito de bigote, *Malacoptila panamensis*.

MALACOPTILA PANAMENSIS PANAMENSIS Lafresnaye

Malacoptila Panamensis Lafresnaye, Rev. Zool., vol. 10, March (April) 1847, p. 79. (Panamá.)

Characters.—Male deeper rufous, with crown nearly concolor with back; female with foreneck deeper buff; both sexes more heavily streaked on lower surface.

A male from Armila, San Blas, February 23, 1963, had the iris red; base of culmen greenish neutral gray, shading to neutral gray around and behind the nostril, and to black along the cutting edge; the entire front part of the maxilla and tip of mandible also black; rest of mandible light yellowish green; tarsus and toes dark grayish green;

tongue and inside of mouth deep black, except for the area beneath the tongue which is neutral gray.

A female from Puerto Armuelles, Chiriquí, taken February 1, 1966, had the iris light red, maxilla black, except for the base of the culmen which was greenish gray; tip and cutting edge of mandible black; rest greenish gray, changing to dull greenish gray on the underside of the mandibular rami; tarsus and toes dull greenish gray; claws neutral gray; inside of mouth as in male.

Measurements.—Males (14 from Panamá), wing 82.8-88.1 (85.3), tail 65.0-77.9 (69.1), culmen from base 27.5-31.0 (29.2), tarsus 16.8-18.4 (17.5) mm.

Females (10 from Panamá), wing 84.0-91.0 (88.1), tail 67.8-77.0 (71.6), culmen from base 28.0-30.6 (29.5), tarsus 17.5-19.1 (18.0) mm.

Resident. Common in forested areas through the Tropical Zone on the Pacific slope from western Chiriquí (Puerto Armuelles) to Darién (Jaqué); to the lower edge of the Subtropical Zone in Chiriquí, and on Cerro Pirre; on the Caribbean side from northern Coclé (Cascajal, El Uracillo) through the northern Canal Zone to eastern San Blas (Armila).

These are birds of the forest, found singly, or in pairs with the two individuals usually somewhat separated, sitting quietly on horizontal branches from the level of the top of the undergrowth to lower branches in the trees above. They appear also in forest edge, and often along trails. As the legs are short compared to the rather heavy, rounded bulk, the body appears to rest on the perch. Their usual movement is to turn the head in their watch for insects on the leaves or twigs on which they may rest. These they seize, carry them to a perch, beat them on the branch, and then gulp them down. The stomach of a bird taken on Cerro Pirre held 2 caterpillars, remains of beetles and orthoptera, and finely ground fragments of cicadas.

The call is rather sibilant and weak, sometimes drawn out, often complaining in tone. Skutch in his account of this bird (Ibis, 1958, pp. 209-231) described also "a rapid, undulatory twittering . . . in a high-pitched, weak voice" that often was continued for several minutes. At Santa Clara also I was told that it had a high-pitched whistling call. There seems to be some superstition regarding them in Chiriquí, as at San Félix, boys gathered around my skinning table called this species *pájaro brujo*, witch doctor bird, and said that its call was like the singing of the *brujos*, of the Guaymí Indians.

In southwestern Costa Rica, Skutch found their breeding season to

extend from March to July, with the main activity in April and May. Several nests that he examined were placed in short, straight burrows dug in slightly sloping ground on the forest floor, with an enlarged nesting chamber at the end. Of 6 nests examined, 1 held 3 nestlings, the others 2 young, or 2 eggs. The eggs are plain white "short and blunt, with little difference in shape at the two ends." One measured 27.8×21.8 mm. Incubation is divided between male and female. The young were completely naked when hatched. In or near the Canal Zone, Arbib and Loetscher (Auk, 1935, p. 327) recorded breeding in July and August.

According to Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, March, 1896, pp. 516-517) Lafresnaye named the typical form from specimens "obtained at Panama by Delattre" which would appear to place the type locality in central Panamá. The subspecies *panamensis* extends to the north and west along the Pacific slope of Costa Rica. At the other end of the range it is found in Colombia in extreme northeastern Chocó at Unguía and Acandí.

An egg of the closely allied race *Malacoptila panamensis magdalenae* collected at El Real, Antioquia, Colombia, March 9, 1948, by M. A. Carriker, Jr., is white with distinct gloss. It is elliptical in form and measures 28.2×22.5 mm. The male flushed from the nest and was taken for a specimen.

MALACOPTILA PANAMENSIS INORNATA (Du Bus)

Monasa inornata Du Bus, Bull. Acad. Roy. Sci. Belg., vol. 14, pt. 2, no. 8, August 1847, p. 107. (Guatemala.)

Characters.—Male with crown grayer than back; both sexes lighter colored on under surface, paler buff on foreneck, less heavily streaked (these differences greater in the female than in the male).

Measurements.—Males (9 from Guatemala, Nicaragua, Costa Rica, and Bocas del Toro), wing 80.0-85.2 (82.5), tail 69.0-79.5 (74.0), culmen from base 26.8-28.8 (27.8, average of 8), tarsus 16.7-18.3 (17.2) mm.

Females (11 from Nicaragua, Costa Rica, and Bocas del Toro), wing 81.7-89.3 (85.4), tail 70.0-76.7 (74.9), culmen from base 26.6-29.0 (28.0), tarsus 16.3-18.5 (17.7) mm.

Resident. Found locally in Bocas del Toro. The population around the Laguna de Chiriquí west to the Río Sixaola represents this race in the Republic. Inland it is recorded on the lower slopes along the Boquete trail back of Chiriquí Grande.

To the north it is found on the Caribbean slope through Central

America to Tabasco in southern México. The female specimen taken on the Río Escondido, eastern Nicaragua, September 23, 1892, by C. W. Richmond, on which he based the name *fuliginosa* (type in the U.S. National Museum) which is very dark on the upper surface and in the streaking below, proves to be unique, others from this area being of the usual coloration of *inornata*. In accordance with this, Ridgway (U.S. Nat. Mus. Bull. 50, pt. 6, 1914, p. 392) listed *fuliginosa* as a synonym of *inornata*.

MICROMONACHA LANCEOLATA (Deville): Lanceolated
Monklet, Juancito Rayado

Bucco lanceolata Deville, Rev. et Mag. Zool., ser. 2, vol. 1, February 1849, p. 56.
(Pampa del Sacramento, Misión de Sarayacú, Río Ucayali, Perú.)

A small puffbird, with heavily streaked breast, and short tail.

Description.—Length 130 mm. Tail strongly rounded, short, slightly less than two-thirds length of wing. Adult (sexes alike), above somewhat dull rufous-brown, with very narrow edgings of dull white to cinnamon-buff; crown somewhat more rufous-brown; forehead, lores, and eye-ring white, bordered by a narrow black line across the forecrown; rectrices dull brown, all except the central pair with a broad subterminal band of black, and a tip of paler brown; wing feathers dusky; secondaries edged narrowly with cinnamon-buff; outermost primary edged broadly, others very narrowly, with buff; flanks and under tail coverts cinnamon-rufous; side of jaw white, bordered posteriorly by black; rest of under surface white, streaked heavily with black; edge of wing white; under surface of primaries and secondaries white to buffy white; under wing coverts variegated with dusky and gray, tipped obscurely with cinnamon.

A female in the British Museum, collected in the Cordillera Macarena, Meta, Colombia, December 14, 1949, by C. C. Doncaster, has the following data on the label: iris black-brown, bill black, feet gray.

Measurements.—Males (4 from Colombia, Ecuador, and Perú), wing 56.8-61.8 (59.6), tail 37.1-40.5 (38.8), culmen from base 21.4-23.6 (22.4), tarsus 12.4-14.4 (13.4) mm.

Females (11 from Costa Rica, Veraguas, Colombia, Ecuador, Perú, and Brazil), wing 58.2-64.6 (61.1), tail 39.1-45.8 (41.4), culmen from base 21.7-24.0 (22.4 average of 10), tarsus 11.5-13.7 (12.2) mm.

Resident. Known in Panamá from 1 female collected on the Río Calovévora, Veraguas, September 6, 1926, by Benson and Gaffney.

There are 2 records from Costa Rica, a female taken at Carrillo, May 1, 1924, and a male from La Hondura, both collected by Austin Paul Smith. In Colombia it has been found on the Serranía de la Macarena, Meta, at La Selva, Caldas, and at Buenavista, Nariño. To the south it is found in Ecuador, Perú, and western Brazil. The female from Costa Rica which has the end of the bill missing was described by Dwight and Griscom (Amer. Mus. Nov., no. 142, Nov. 3, 1924, p. 2) as *M. l. austinsmithi* from its broad, rather heavy bill base. In coloration and pattern of marking it resembles specimens from South America. Some from the latter area have the bill base equally broad. The material examined seems too uniform to allow division in subspecies.

Nothing is recorded of habits or voice in this species.

According to Sclater (Mon. Jacamars, Puff-birds, 1882, p. 132) the type specimen was collected by Deville, naturalist on the Castelnau Expedition from Lima to Pará. According to Deville the bird was taken in the Pampa del Sacramento near "Sarayacu," which Sclater says is on the Río Ucayali in Perú. This locality Sclater explains is not to be confused with Sarayacú on the Río Bobonassa, in the Oriente of Ecuador, where Indians brought 4 specimens to Buckley, collected with blowguns. Sclater mentions another from the Río Napo, Ecuador, that he had examined in Jardine's collection, who had received it through "Prof. Jameson of Quito." The 4 collected by Buckley, in the British Museum, which do not have the sex indicated, agree in form of bill and markings with the specimen from the Macarena mountains of Colombia.

**NONNULA FRONTALIS STULTA Wetmore: Gray-cheeked
Nunlet, Juancito Acanelado**

Nonnula frontalis stulta Wetmore, Smithsonian Misc. Coll., vol. 122, no. 8, December 17, 1953, p. 3. (El Uracillo, Río Indio, northern Coclé, Panamá.)

Small; foreneck and breast plain rufous-brown; side of head gray.

Description.—Length 135-150 mm. Two slightly different color phases, one rufescent, the other grayer.

Adult male, crown brown, more chestnut on the forehead; rest of upper surface olive-brown to sepia-brown; wings and central rectrices dusky brown, edged with ochraceous-brown; outer rectrices light brown on outer web, somewhat darker on inner web; side of head gray; malar region and side of neck tawny-brown; foreneck and upper breast tawny-ochraceous; sides and flanks cinnamon-buff; center of abdomen and under tail coverts white; edge of wing tawny;

inner webs of primaries and secondaries at base, and under wing coverts light cinnamon-buff.

Female, slightly paler above and below.

Juvenile, two outer rectrices lighter brown.

A male from Boca de Paya, Darién, taken March 12, 1959, had the iris dark brown; thickened margin of eyelid pale brick red; space around nostril, and the mandible light neutral gray; rest of maxilla and cutting edge of mandible dusky neutral gray; inside of mouth, including upper surface of tongue, black; tarsus and toes neutral gray; claws black.

A female from Juan Mina, Canal Zone, collected January 16, 1961, had the line of the culmen, distal half of the maxilla, and the cutting edge and tip of the mandible dull black; rest of bill neutral gray; tarsus and toes dark greenish gray. Another of this sex from El Real, Darién, January 24, 1964, had the thickened edge of the eyelid pale rose-red; tip of maxilla, and tip and cutting edge of mandible black; rest of bill neutral gray; tarsus pale dull brown. Otherwise these females were like the male.

Measurements.—Males (12 from Panamá), wing 55.2-58.8 (56.9), tail 52.3-58.7 (55.1), culmen from base 22.6-24.4 (23.4), tarsus 13.0-14.7 (13.6) mm.

Females (18 from Panamá), wing 55.1-59.7 (57.7), tail 53.6-59.6 (57.2), culmen from base 22.4-25.6 (23.9), tarsus 12.2-14.2 (13.2) mm.

Minor differences between these measurements and those given in the original description of *N. f. stulta* are due to a few additions and substitutions in the series measured.

Resident. Recorded locally on the Caribbean slope near the Río Indio in northern Coclé (El Uracillo), and in the lower Chagres Valley in the Canal Zone; on the Pacific slope in the eastern sector of the Province of Panamá (Tocumen, Pacora, La Jagua, Chepo) through Darién (mainly in the valleys of the Río Sambú, the Tuira, and the Chucunaque).

These attractive little birds range in gallery forest from the undergrowth to the lower tree crown, and also in thickets and second growth. When they have rested quietly, like the larger species of the family, I have mistaken them for flycatchers. In contrast, regularly they move slowly through the branches, or more actively, join the small groups of forest birds that in company search quickly through the cover of leaves. On such occasions their movements suggest those of small ant-shrikes. The stomachs of those that I have examined

have held fragments of orthoptera, caterpillars, earwigs, small beetles, membracids, and spiders.

The species was reported first from Panamá in the early collections made by McLeannan and Galbraith on the Atlantic slope near the railroad. Later W. W. Brown, Jr., secured a pair in this same area, and in more recent times the bird has been found occasionally on Barro Colorado Island. To the east it is more common, as most of the more recent reports come from eastern Panamá Province and Darién. The little known of its life is found in the few statements above. I have never heard it call, and nothing is reported of its nesting.

The genus *Nonnula* is widely distributed in South America through the Amazon Basin, and beyond ranges to the south to northern Argentina. The several species currently recognized, in the main, are quite similar in general appearance. It is probable that when they are better known some of those now treated as distinct will prove to be more closely related as geographic races. The forms of Panamá and northern Colombia, the most northern in distribution, recently through general resemblance have been listed as subspecies under *Nonnula ruficapilla*. The pattern of coloration in nominate *ruficapilla*, and in the related race *rufipectus*, is distinct in its extent of gray on the side of the head and neck, and bright brown crown in contrast with the duller colors of the rest of the dorsal surface. *Nonnula frontalis* is duller and more uniform in hue. Until the entire genus is better known it has seemed desirable to follow the allocation by Peters (Check-list Birds World, vol. 6, 1948, p. 20), as a distinct species.

The race of Panamá compared to typical *frontalis* of northwestern Colombia, found from north-central Antioquia east to the middle Magdalena Valley, is somewhat grayer, less rufescent above, with the crown duller brown, and on the average very slightly duller brown on breast and foreneck. A still paler race, *Nonnula frontalis pallens* is found in the lower Magdalena Valley and west along the Caribbean littoral to the lower Atrato, where it occurs at Unguía and Acandí in northern Chocó. Central Panamá marks the northern limit of the genus.

MONASA MORPHOEUS (Hahn): White-fronted Nunbird, Monja

FIGURE 61

Bucco Morphoeus C. W. Hahn, Vög. Asien, Afrika, Amer. u. Neuholland, vol. 2, 1823, pt. 14, pl. 2, text. (Rio de Janeiro, Brazil.)

Above medium size, dark in color, with white forehead, and rather long decurved, orange-red bill.

Description.—Length 270-300 mm. Adult (sexes alike), forehead and anterior lores white; rest of head black, changing to slate on hindneck, back, and rump; wing coverts paler gray in one race (*pallescens*); tail bluish black; primaries and secondaries slate-black,



FIGURE 61.—White-fronted nunbird, monja, *Monasa morphoeus*.

the latter edged more or less with slate; foreneck black like crown, changing to slate-gray on middle of breast; one race (*grandior*) with white chin; under tail coverts slate-black; under wing coverts, and inner base of primaries pale gray to slate-gray.

Immature, similar, but with white of forehead (and chin, in the race *grandior*) cinnamon to tawny-buff.

The species is one of wide range in Central America on the Caribbean slope from southeastern Honduras through Nicaragua and Costa

Rice to Bocas del Toro. From eastern Panamá, where it is found on the Pacific side, it continues through tropical South America to Bolivia and southeastern Brazil. In this extensive area several geographic races are recognized of which three are found in Panamá. While the species is one long known, there has been confusion with regard to its geographic variation that has been clarified only recently.

The name *morphoeus*, attributed currently incorrectly to "Hahn and Küster," as of 1823 should be cited from Hahn alone. The manuscript records of Charles W. Richmond list Carl Wilh. Hahn as the sole author of *Die Vögel aus Asien, Afrika, Amerika und Neuholland*, of which volume 1, parts 1-12 were issued from 1818 to 1822, and volume 2, parts 13-19 from 1822 to 1836. This is verified by Sherborn (Ind. Anim., Sect. secunda, 1801-1850, pt. 1, 1922, p. lxiv), with the additional information that the work was reissued in 1850 under the authorship of Hahn and Kuester, with the addition of part 20. The puffbird *morphoeus* was described in the original account as from Brazil. Pinto (Arq. Zool. Est. São Paulo, vol. 5, art. 6, 1947, p. 388, footnote) has designated the type locality as Rio de Janeiro, so that the name of the typical race applies to the population of southeastern Brazil. The subspecies found from the Amazon southward, and in the west to southeastern Colombia and eastern Perú, for which the name *morphoeus* has been current, is *Monasa m. peruana* Sclater (with *Monasa rikeri* Ridgway as a synonym), as shown by Gyldenstolpe (Ark. Zool., ser 2, no. 1, 1951, pp. 111-112). That author cites the type locality of *peruana* as Chamicuros, Río Huallaga Valley, northern Perú.

These are birds of the forests that are found regularly at the forest edge and in open areas along the larger streams.

MONASA MORPHOEUS GRANDIOR Sclater and Salvin

Monasa grandior P. L. Sclater and O. Salvin, Proc. Zool. Soc. London, October 1868, p. 327. (Angostura, Costa Rica.)

Characters.—Both chin and forehead white; head and neck black, this color not extending on upper breast; averaging slightly larger.

Measurements.—Males (10 from Bocas del Toro, Costa Rica, and Nicaragua), wing 131.7-147.7 (140.0), tail 119.7-125.9 (122.6), culmen from base 37.0-41.9 (39.3), tarsus 20.0-22.3 (21.2) mm.

Females (10 from Costa Rica and Nicaragua), wing 139.0-144.6 (141.6), tail 120.4-128.5 (123.8), culmen from base 39.3-42.7 (40.1), tarsus 21.0-23.0 (22.0) mm.

Resident. Found in the forests of western Bocas del Toro from the lowlands to the lower edge of the Subtropical Zone.

The first report of this bird from the Republic is by Carriker (Ann. Carnegie Mus., vol. 6, 1910, p. 581), who in his statement of the range in Costa Rica mentioned "the Caribbean slope of . . . northern Chiriquí," and among the localities for his specimens included "Cuabre." His camp there according to information that he gave me was on the Costa Rican bank of the Río Sixaola in the center of the big bend in the river about 4 kilometers southeast of the place marked Margarita on modern maps. The most eastern record in Panamá is of male and female taken by Kennard, March 9 and 23, 1926, near 750 meters on the Boquete trail back of Chiriquí Grande. Two in the Havemeyer collection at Yale were taken the following year by Austin P. Smith at Sibube on the Río Sixaola on February 12, and at Zegla, on the lower Río Terebe, a tributary of the Río Changuinola, on May 16. A male in the U.S. National Museum came from the Gorgas Memorial Laboratory collected by Rudolfo Hinds, September 20, 1961, at about 750 meters on the Río Changuena, on the headwaters of the Changuinola.

This race ranges north on the Caribbean slope to southeastern Honduras.

MONASA MORPHOEUS FIDELIS Nelson

Monasa fidelis Nelson, Smithsonian Misc. Coll., vol. 56, no. 37, February 16, 1912, p. 1. (Cerro Azul, 250 meters elevation, eastern Province of Panamá, Panamá.)

Monasa similis Nelson, Smithsonian Misc. Coll., vol. 56, no. 37, February 16, 1912, p. 1. (Cerro Azul, 250 meters elevation, eastern Province of Panamá, Panamá.)

Characters.—Like *M. m. grandior*, but with black of neck extending farther down on the upper breast, including also the upper sides; averaging slightly smaller. Some show intergradation with *M. m. pallescens* in having the chin black (instead of white), but with the wing coverts slate.

Measurements.—Males (3 from the eastern sector of the Province of Panamá), wing 131.8-138.8 (134.7), tail 114.5-122.6 (119.0), culmen from base 37.4-40.8 (39.6), tarsus 19.3-20.1 (19.7) mm.

Females (7 from the eastern sector of the Province of Panamá), wing 134.6-140.2 (136.5), tail 116.5-127.6 (122.7), culmen from base 39.3-43.4 (41.7), tarsus 21.0-22.8 (21.8) mm.

A male, taken near the Candelaria Hydrographic Station on the

Río Pequení, March 4, 1961, had the iris dark wood brown; basal half and tip of the line of the culmen fuscous-black; rest of bill rather dull red; tarsus dusky neutral gray; toes and claws black.

Resident. Fairly common over the Cerro Azul, ranging to the eastern end above the Río Mamoni, and to near the lower Río Bayano back of Chepo; found also on the lower Río Boquerón and the Río Pequení above Madden Lake.

Two seen, possibly accompanied by others, were whistling and calling on Wheeler trail, Barro Colorado Island, April 6, 1950. On March 18, 1952, I noted several at Chilar on the lower Río Indio, Colón.

Three females, including the bird taken by Goldman on Cerro Azul March 24, 1911, which Nelson described as *Monasa similis*, and 2 that I collected on the Zanja Limón above the Río Mamoni, back of Chepo, have the throat black instead of white. Otherwise they are like typical *fidelis*. They are considered to be intergrades toward *pallescens*, found farther east, back of Chimán.

MONASA MORPHOEUS PALLESCENS Cassin

Monasa pallescens Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 134. (Mountains on the Río Truandó, Chocó, Colombia.)

Monasa pallescens minor Nelson, Proc. Biol. Soc. Washington, vol. 26, March 22, 1913, p. 67. (Marraganti, Darién, Panamá.)

Characters.—Throat black; wing coverts light slate to pale gray; black extending farther down on breast; averaging slightly paler gray above and below than *fidelis*; rarely with a little white mixed with the black on the chin (seen in a male from the Río Tacarcuna, Darién).

A male, taken at Boca de Paya, Darién, February 21, 1959, had the iris bright brown; bill deep red; tarsus and toes dark neutral gray; claws dull black.

A female, collected at Armila, San Blas, March 6, 1963, had the iris warm brown; bill red; tarsus dark neutral gray; toes fuscous-black; claws black.

Measurements.—Males (11 from Panamá), wing 130.1-141.9 (134.4), tail 114.7-130.8 (121.4), culmen from base 37.2-42.0 (39.6), tarsus 19.8-22.6 (21.1) mm.

Females (13 from Panamá), wing 135.3-141.8 (138.0), tail 120.0-129.6 (124.5), culmen from base 37.3-43.1 (40.5), tarsus 20.1-22.0 (21.3) mm.

Resident. Fairly common in forest areas from the Río Chimán, eastern Province of Panamá east through Darién; also on the head-

waters of the Río Pito, behind Armila, San Blas; to 450 meters on Cerro Pirre, and to 575 meters on the upper Río Tacarcuna.

This is the race that I have found to be the most common and widely distributed during my years of field work in the Republic. They are social birds of the heavier forests that range 2 or 3 together, or in groups of 6 or more, that move about in company. They appear regularly in the trees at the forest edge along the playones on the larger streams, and in settled areas at the borders of clearings. On the wing in short flights through the tree crown they often suggest jays. Their food is composed of a variety of insects, usually those of medium size. They are adroit in capture as I have seen them taking moths and small butterflies on the wing. Small frogs and lizards also are captured. Usually they are more active than other puffbirds, but also rest quietly when not searching for food.

Nunbirds have a variety of loud, whistled and gabbled notes often uttered excitedly by several birds simultaneously. In this 3 to 6 may pose stiffly on a horizontal branch, spaced evenly 20 or 30 centimeters apart, with open bills pointing upward, while they call in rapid medley for several minutes, a spirited and amusing concert. On the Río Jaqué in mid-April they were especially noisy, and those taken for specimens were approaching breeding condition. In displays one bird that I believed to be a male would posture with the tail spread fan-shape, partly open wings, and opened bill pointing upward, while it swayed toward its quiet companion. The Chocó Indians told me that the *monjas* nested like motmots in burrows dug in banks. Some of the birds collected or observed had worn tail tips.

On the Río Jaqué they were known as *pájaro sonza*, while on the Tuira they were sometimes called *piloto*.

Family CAPITONIDAE, Barbets, Capitanes

This tropical family, of more than 70 species, is most abundant in the Old World especially in Africa, but ranges widely also in southern Asia. Twelve species are known in America of which three are found in Panamá. All are birds of rather heavy, muscular bodies, with plumage in some that is variegated with bright color, but in others is plain and rather dull.

The name barbet (bearded) comes from the bristlelike feathers that project forward around the bill, more heavily developed in many of the foreign kinds than in those of America. Several of those of the Old World are widely known by their voices, a constant repetition of a metallic call, varying in the different species, but a sound that is monot-

onous and sometimes annoying in its steady, unvarying utterance. Though barbets may eat insects, or rob other birds of their eggs, their main food is berries or large fruits, abundant in the forests in which they live.

Most share with woodpeckers the custom of making holes in trees for nests, though the rather blunt-billed barbets choose dead limbs or trunks in which the wood is soft, as they excavate by biting rather than by hammering. The white eggs are laid on a few chips in the bottom of the cavity.

KEY TO SPECIES OF CAPITONIDAE

1. Tip of mandible notched to receive the sharp point of the maxilla; bill stouter, heavier; color pattern plain.
 Prong-billed barbet, *Semnornis frantzii*, p. 500
 Bill more slender, smooth and plain; plumage variegated with black, red, or orange 2
2. Back and tail black, a red or orange-red streak on the flanks.
 Spot-crowned barbet, *Capito maculicoronatus*, p. 492
 Back and tail dark green; flanks without red.
 Red-headed barbet, *Eubucco bourcierii*, p. 496

CAPITO MACULICORONATUS Lawrence: Spot-Crowned Barbet, Capitán de Corona Manchada

FIGURE 62

Size medium, with heavy, stocky body; flanks streaked with orange-red or red; male with center of the white breast orange-yellow; female, breast and foreneck black.

Description.—Length 160-175 mm. Adult male, center of crown white, the feathers black basally, in some tipped, or with a subterminal bar or edging, of dull brown to brownish white; nape dull dark brown; rest of upper surface, including forehead, sides of head and neck glossy blue-black; wing coverts black, edged more or less with glossy blue-black; wings and tail black; lower surface white with a wash of yellow on the upper breast, becoming more orange in the center to form an indefinite spot; sides spotted heavily with blue-black; a streak of red or orange-red on the flanks; under wing coverts white, barred slightly with black; under surface of primaries and secondaries white at base.

Females, like male, but with foreneck and breast wholly blue-black; red or orange-red of flanks more extensive.

These are forest birds that range mainly in the tree crown, usually

hidden by leaves, so that probably they are more prevalent than the usual casual observations during daily work in the field may indicate. They come regularly to feeding trees, and may appear also on open perches in dead or leafless tree tops. Their robust, muscular bodies, short tails, and large heads give them a heavy appearance. In this, however, they differ from the puffbirds, as the plumage is firm instead of loose and lax, and the birds themselves are more active.

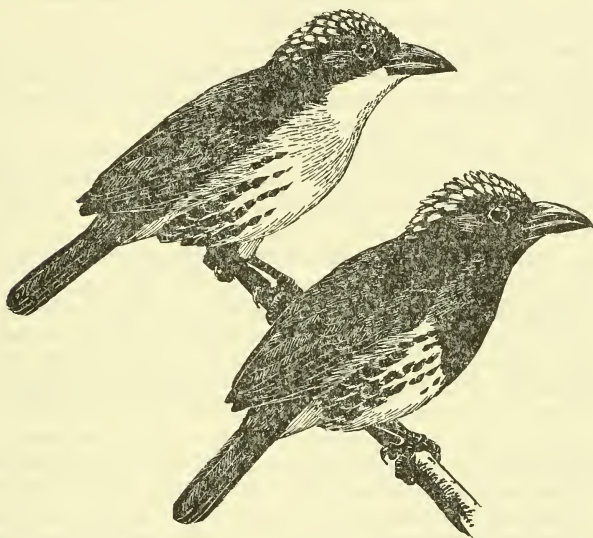


FIGURE 62.—Spot-crowned barbet, capitán de corona manchada, *Capito maculicoronatus*, male above, female below.

Two races are found in Panamá, one in the central area, and the other in Darién and San Blas.

CAPITO MACULICORONATUS MACULICORONATUS Lawrence

Capito maculicoronatus Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1861, p. 300. (Atlantic slope, Canal Zone, Panamá.)

Characters.—Lateral streak on flanks orange-red.

A male taken on the upper Río Guabal, on the Caribbean slope of Coclé, February 28, 1961, had the iris very dark brown; tip of

bill dull black; cutting edge of maxilla and mandible dusky neutral gray; rest of bill light neutral gray; tarsus, toes, and base of claws neutral gray; tip of claws dark neutral gray.

Measurements.—Males (10 from Coclé, Canal Zone, and adjacent Province of Panamá), wing 77.8-82.9 (79.2), tail 47.4-51.2 (48.6), culmen from base 21.5-23.7 (22.1), tarsus 21.9-24.9 (22.9) mm.

Females (10 from Coclé, Panamá, Canal Zone, Colón, and Darién), wing 75.9-80.7 (78.1), tail 45.7-49.3 (47.4), culmen from base 21.0-23.8 (22.0), tarsus 22.5-23.8 (22.7) mm.

Resident. Not common; found locally on the Caribbean slope from northern Coclé east to the northern Canal Zone, and above Madden Lake on the lower Río Pequeni; crossing to the Pacific slope on the headwaters of the Río Pacora in the Cerro Azul.

The first specimens from which this interesting bird was described were collected about 1860 on the Atlantic slope of the Canal Zone by James McLeannan. The following year McLeannan and Galbraith secured others, 1 male, and 2 females. Lawrence loaned a pair to P. L. Sclater in London, who had them painted for publication, with a note on the plumages of the two sexes (Ibis, 1862, p. 1, pl. 1). In addition to these early specimens there is a male in the National Museum received from Thomas Rhodes marked "near Panama City." A letter from Rhodes in the accession papers dated February 20, 1866, states that he collected with his brother near Panama City in December 1865, and that they also bought other birds of "Mr. McClellan of Lion Hill." This certainly refers to McLeannan, the station master at Lion Hill, who had forwarded the earlier specimens mentioned. The Rhodes skin bears a small, paper tag with "No. 37, F." written on it in McLeannan's script so that the bird must have been taken on the Atlantic slope where that collector worked, rather than "near Panama City" as stated on the label. W. W. Brown, Jr., secured 2 males at Lion Hill in March, 1900 (Bangs, Proc. New England Zool. Club, vol. 2, 1900, p. 18). Jewel secured a male at Mt. Hope in the Canal Zone, a short distance south of Colón, on February 22, 1913 (Stone, Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, p. 258). Mrs B. B. Sturges (Field Book Birds Pan. Can. Zone, 1928, p. 215) listed a sight record on Barro Colorado Island.

In my own studies we found this race first on Cerro Azul, April 23, 1949, when a male was taken at the Quebrada Carriaso in the upper drainage of the Río Pacora. We recorded it next at El Uracillo in northern Coclé on the headwaters of the Río Indio, where 1 was taken February 27, 1952, and a pair on the following day, as they

were feeding at a berry-bearing tree. They were seen again on the head of the Río Guabal on the Caribbean slope, also in northern Coclé, on February 28, and March 1, 1961. On the latter date 3 came at sunset to rest in a vine-covered tree.

Published records of this bird for Veraguas date from Salvin (Proc. Zool. Soc. London, 1867, p. 157) who listed a specimen from "Santiago de Veragua" purported to have been received from Arcé. This is included also by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, p. 548) as "Santiago de Veraguas." Shelley (Cat. Birds Brit. Mus., vol. 19, 1891, p. 110), in his account of this species, lists 2 males and 1 female attributed to "Veragua (E. Arcé). Salvin-Godman Coll." It is possible that they were taken on the Caribbean slope in the Calovévora area, where Arcé secured other birds, but this is not certain. The Santiago report from far out on the level lands on the Pacific side is too distant from the known range to be accepted. To date there are no certain records for Veraguas.

CAPITO MACULICORONATUS RUBRILATERALIS Chapman

Capito maculicoronatus rubrilateralis Chapman, Bull. Amer. Mus. Nat. Hist., vol. 31, July 23, 1912, p. 144. (Juntas de Tamaná, Chocó, Colombia.)

Capito maculicoronatus pirrensis Nelson, Smithsonian Misc. Coll., vol. 60, no. 21, p. 1. (Cana, 550 meters elevation, Cerro Pirre, Darién, Panamá.)

Capito maculicoronatus melas Griscom, Bull. Mus. Comp. Zool., vol. 72, January 1932, p. 340. (Puerto Obaldía, San Blas, Panamá.)

Characters.—Lateral streak on flanks bright red.

Measurements.—Males (10 from Darién and San Blas), wing 77.5-80.5 (79.4), tail 45.4-50.2 (47.7), culmen from base 21.0-23.5 (22.0), tarsus 21.9-23.4 (22.8) mm.

Females (10 from Darién), wing 76.1-81.1 (79.0), tail 46.0-49.7 (47.7), culmen from base 21.6-23.2 (22.2), tarsus 21.9-23.2 (22.3) mm.

Resident. Fairly common. On the Pacific side recorded in Darién from Cerro Sapo to Jaqué, the Río Jaqué, the Río Tuira drainage from El Real to the mouth of the Río Paya, at Cana, 550 meters elevation, on Cerro Pirre, and at 575 meters on the upper Río Tacarcuna; less numerous on the Caribbean slope in San Blas where it has been taken at Bahía Caledonia, Armila, and Puerto Obaldía.

This eastern population is fairly widespread in Darién, but apparently is less common along the San Blas coast. I recorded them singly or 2 together ranging through the forest canopy, and occasionally found 3 to 6 in company. They came to feed at berry-bearing

trees, and also searched through masses of creepers. Their calls, heard regularly, were harsh and croaking in sound, suggestive in tone of the notes of the long-tailed forest wrens of the genus *Campylorhynchus*.

Though their breeding is not recorded so far as I know, it is supposed that they nest in cavities. In confirmation of this, I saw females examining old woodpecker holes and other similar openings. One taken April 16, 1947, on the Río Jaqué was near laying. Stomachs of those that I have examined held remains of drupes, with addition of fragments of orthoptera in one.

The bird of Cerro Pirre has been described as a distinct race, and that of the San Blas as another. With more extensive series of specimens now available (more than 50 individuals in all) birds of both of these areas prove to be the same as the population of north-western Colombia named by Dr. Frank M. Chapman. In the entire range there is some variation in extent of the black markings on the sides, but this is individual and not peculiar to any restricted area. Beyond Panamá this form ranges in northern Colombia from northern Chocó to the middle Magalena Valley.

**EUBUCCO BOURCIERII (Lafresnaye): Red-headed Barbet,
Capitán cabecirrojo**

Micropogon Bourcierii Lafresnaye, Rev. Zool., vol. 8, May 1845, p. 179. (Bogotá, Colombia.)

Small; back, tail, and wings green; male with head and foreneck red; females with foreneck yellowish green, cheeks grayish blue.

Description.—Length 140-155 mm. Chin, lores, and a very narrow line along the base of the bill connecting these two areas black; rest of head and foreneck clear red; a narrow line of white across the hindneck; rest of upper surface dull green; wings dusky, with the outer webs olive-green; tail dull green, with the line of the shafts dull black; breast orange, in some with the upper breast washed with red, changing posteriorly to yellow on the lower breast, and to white on the abdomen and under tail coverts; sides and flanks tipped with dull green, the feathers basally grayish green, this color forming broad, somewhat indefinite streaks; inner webs of flight feathers basally white; under wing coverts and edge of wing yellowish white, with the feathers on the carpal area dusky basally.

Female, forehead, lores, and a narrow line around the eye black; rest of crown and nape olive-green, with a wash of dull orange-yellow, heavier and more prominent on the center of the crown;

cheeks and a narrow line above and back of eye grayish blue; a small black post-auricular spot, and a posterior bar of saffron-yellow; throat grayish yellow, bordered posteriorly by a band of saffron-yellow or orange; lower breast olive-yellow; rest of under surface, including the under wing area, as in male.

Immature male, with the posterior area of the crown and the hind-neck dark green, washed lightly with saffron-yellow.

Whether these smaller, green-backed barbets are to be recognized as comprising a genus *Eubucco* distinct from the others is not clear from available data. The several species that comprise the group, all with green upper surface and bright red heads in the males, differ in general appearance from the larger forms of the genus *Capito*, but in detail of external structure all are closely similar. The only difference is in the form of the culmen, particularly at its base. The upper surface of this area in *Capito* becomes flat posterior to the center, and remains broad, with little or no constriction, until the horny ramphotheca terminates on the forehead. In the *Eubucco* group the culmen remains rounded throughout its length, and becomes decidedly narrowed at the distal end. Until skeletons are available for comparison it seems desirable to continue the use of *Eubucco* as found in Peters (Check-list Birds World, vol. 6, 1948, p. 27) rather than to list the species concerned in the genus *Capito*.

In the original description Lafresnaye had both male and female specimens. As the sexes differ so greatly he thought that two species were represented, so that he named the male *Micropogon bourcierii* and the female *M. hartlaubi*. The error finally was recognized by Salvin (*Ibis*, 1870, p. 111) who found on examination of the specimens available on which the sex was indicated that all males were called *bourcierii* and all females *hartlaubi*. In recognition of this Shelley later named the subspecies of Costa Rica and Panamá *salvini* in his honor.

The red-headed barbet, the more common of the three kinds of barbets found in Panamá, has two subspecies represented in the Republic, one around the volcano in the west, and the other in the mountains near the Colombian boundary.

EUBUCCO BOURCIERII SALVINI (Shelley)

Capito salvini Shelley, Cat. Birds Brit. Mus., vol. 19, 1891, p. 108 (in key), p. 119, pl. 5, fig. 4. (Costa Rica to Chiriquí.)

Characters.—Male with breast distinctly orange; female with fore-neck yellower green.

A male, taken on Cerro Pando, beyond El Volcán, Chiriquí, February 27, 1954, had the iris brownish red; bill greenish yellow, changing to honey yellow at tip; tarsus and toes greenish gray; under side of toe pads honey yellow.

Worth (Auk, 1938, p. 535) recorded the iris in a female as deep reddish orange, and the colors of bill and feet as in the male listed above.

Measurements.—Males (15 from Chiriquí), wing 68.8-73.4 (71.2), tail 45.4-50.8 (47.8), culmen from base 18.5-20.2 (19.3), tarsus 19.0-21.6 (19.9) mm.

Females (13 from Chiriquí), wing 67.2-71.2 (69.6), tail 44.0-49.8 (46.8), culmen from base 18.0-20.8 (19.2), tarsus 18.7-20.5 (19.7) mm.

Resident. Fairly common, in the Subtropical Zone ranging down to the upper tropical area from above Boquete westward around the Volcán de Chiriquí to Cerro Pando and west to Santa Clara; found on the Caribbean slope of the volcano in Bocas del Toro.

Like the spot-crowned barbet this is a bird of forested areas, where it ranges mainly in undergrowth, going higher in the tree crown to eat the berries in feeding trees. They appear regularly in the forest edge, and also are common in thickets adjacent to forests. Occasionally one or two will join the scattered bands of smaller birds that forage in company, and then in search of insects may move through the lower tree crown. In such gatherings they appear active as they move among the leaves, but when alone they often rest quietly for several minutes.

C. Brooke Worth (*loc. cit.*, pp. 535-536) found 2 nests near El Volcán, in June and July, 1937, both in old woodpecker holes in fenceposts hidden in thickets adjacent to the edge of forest. In 1 nest, located on June 22, he observed the male as it entered the nest hole during the day, and at night found the female on the eggs, indication that both parents shared in the duties of incubation. The 2 plain white eggs in this nest were laid in the bottom of the cavity, which had no nest lining. One held a 5-day embryo, in the other incubation had not begun. From examination of the gonads of the female he determined that the set was complete. The 2 eggs measured 16×25 and 17×24 mm. The second nest held 3 young about 5 days old. These were kept under observation until July 11, when they were collected for study specimens. They were fed on insects. He recorded that the adults "never went directly to the nest. Arriving with their beaks full of insects, they usually sat in a small bush about twenty feet

away, seeking the inner twigs next the main trunk. Here they waited perfectly silent and motionless. . . . Finally at no discernible stimulus, one would fly quite openly to the post and enter it at once. . . . Eventually it would fly out, carrying droppings from the nest. Returning to the bush 20 feet away, it would relinquish the droppings, and then disappear into the forest." The young in the nest called constantly with squeaky notes to their parents. Worth remarked that the latter were silent, and that he never heard one utter a sound, which agrees with my own observations. Slud in his work in Costa Rica also noted that in his experience these birds were always silent.

Beyond Panamá the race *salvini* ranges on the Caribbean slope to central Costa Rica, and is found less commonly on the Pacific side.

EUBUCCO BOURCIERII ANOMALUS Griscom

Eubucco bourcierii anomalus Griscom, Bull. Mus. Comp. Zoöl., vol. 69, no. 8, April 1929, p. 163. (Cana, Cerro Pirre, Darién, Panamá.)

Characters.—Streaking on under surface averaging slightly narrower; very slightly smaller in size; male with breast more yellow, less orange; female, with the side of the head lighter blue, like *E. b. salvini*; throat duller, greener, like *E. b. occidentalis* of northwestern Colombia.

A male, taken on Cerro Malí, Darién, February 26, 1964, had the iris dark red; bill greenish yellow; tarsus and toes olive-green; claws greenish neutral gray.

Measurements.—Males (7 from Darién), wing 67.0-69.6 (68.1), tail 43.8-46.8 (44.9), culmen from base 17.5-18.9 (18.6), tarsus 19.0-20.8 (19.9) mm.

Females (5 from Darién), wing 65.2-68.7 (66.6), tail 43.5-46.4 (45.0), culmen from base 18.1-18.8 (18.6), tarsus 19.8-20.5 (20.1) mm.

Resident. Rather rare on Cerro Pirre, and on the slopes of Cerro Tacarcuna, Darién, from 550 to 1,450 meters.

My only view of this bird in life was in the undergrowth in open forest beside our camp clearing on Cerro Malí. Dr. Galindo collected a male June 1, 1963, where that ridge joined the slopes of Cerro Tacarcuna proper, and an immature male fully grown at 575 meters on the upper Río Tacarcuna, in July 1963. E. A. Goldman secured 5, all immature, at Cana, on Cerro Pirre from June 6 to 11, 1912.

In the stomachs of those taken by Goldman 2 were filled with fragments of 2 or more kinds of berry seeds. Another held a small scorpion entire, bits of a spider, parts of a beetle and a caterpillar,

and bits of berries. In another were fragments of 3 kinds of beetles, 2 earwigs, a dipteran, a caterpillar, and 1 seed.

SEMNORNIS FRANTZII (Sclater): Prong-billed Barbet, Cacareón

FIGURE 63

Tetragonops frantzii Sclater, Ibis, vol. 6, nos. 23 and 24, July and October, 1864, p. 371. (Near San José, Costa Rica.)

Medium in size, dull in color; olive-green above, buffy brown on the foreneck and upper breast.

Description.—Length 170-185 mm. Bill broad and thick; tip of mandible bifurcate; maxilla toothed subterminally, notched distally, with the slender tip resting in the divided end of the mandible. Male, crown rather dull golden brown; nape, hindneck, and upper back brownish olive, changing to olive-green on wing coverts, lower back, rump, and upper tail coverts; tail duller green; an elongated tuft of glossy black feathers on the back of the head; wings fuscous; outer webs of secondaries dull olive-green, of primaries brownish olive; lores, anterior malar region, and chin dull slaty black, some with the forehead also narrowly lined with that color; rest of side of head, foreneck, and upper breast buffy olive, becoming brighter, more yellow on lower breast, and distinctly pale yellow on the center of the abdomen; a patch of pale bluish gray, with an indistinct anterior bar of dull black, on each side of the breast; sides and flanks dull grayish, washed lightly and indistinctly with yellow; tibia and under tail coverts dull, somewhat olive-green; edge of wing brownish buff; under wing coverts pale olive-buff; under surface of primaries at base dull yellowish buff.

Female, similar but without the black nuchal tuft.

Immature male, grayish patch on sides of breast only partly developed, or lacking.

On the label of a male from Costa Rica, José Zeledón marked the iris as dark chestnut and the feet olive-green. On another, Austin Smith described the iris as red, and the tarsus olive. In females, Zeledón noted the iris as brick red and the feet dark plumbeous. Austin Smith in a specimen marked the iris dark crimson.

Measurements.—Males (10 from Chiriquí and Costa Rica), wing 83.7-91.4 (87.6), tail 57.0-65.2 (60.7), culmen from base 17.9-20.2 (18.8), tarsus 24.9-28.7 (26.8) mm.

Females (10 from Chiriquí and Costa Rica), wing 84.7-91.6 (86.4), tail 55.7-63.2 (59.5), culmen from base 17.7-19.2 (18.6), tarsus 25.3-28.8 (26.2) mm.

Resident. Uncommon; found in the cooler areas of the Subtropical Zone around Volcán de Chiriquí from 1,525 to 2,000 meters elevation; above Boquete recorded from Quiel, Bajo Mono, Horqueta, and the slopes of the Continental Divide; above and below Cerro Punta on the head of the Río Chiriquí Viejo; also north of the Continental Divide beyond Boquete, in Bocas del Toro; and east to Cerro Flores.

This interesting species, described from Costa Rica, and well known from that country, was first recorded from Panamá by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, p. 550) with the statement "All the specimens of this bird we have seen came from Costa Rica, except one, and this was sent by Arcé from Veraguas after the second paper on his birds was published in 1870." The allocation of this bird to "Veraguas" certainly is in error as the species is not known east of western Chiriquí. The specimen, now in the British Museum, is listed by Shelley (Cat. Birds Brit. Mus., vol. 19, 1891, p. 121) as "ad. sk. Veragua. Salvin-Godman Coll." Veragua in those early days included all of western Panamá to Costa Rica. In this instance it appears that Arcé collected the bird during his later work near Boquete, in Chiriquí. The species was first reported in detail for the Republic by Bangs (Proc. New England Zool. Club, vol. 3, 1902, p. 32) from a series of specimens collected by W. W. Brown, Jr., near Boquete from March to June 1901, including also the Caribbean slope north of the Continental Divide in Bocas del Toro. Blake (Fieldiana: Zool., vol. 36, 1958, pp. 524-525) listed 10 specimens from the Mönniche collection taken between 1932 and 1952 in the mountain area above Boquete.

I have found the prong-billed barbet only on one occasion, above Cerro Punta in the high valley at the beginning of the old trail that leads around the mountain to Boquete. In the early morning of February 25, 1960, as the sun began to warm the chilly air a flock of 4 or 5 flew one by one across an open trail in a pasture grown with scattered stands of low brush. The birds stopped in a vine-covered shrub bearing ripening drupes, where they fluttered and hopped about with low, chattering calls, appearing large and heavy-bodied, but moving actively. Two males were collected. They were near the border of cloud forest where the air was cool and moist, mists were of regular occurrence even in dry season, and rain at other periods heavy.

In Costa Rica where this species is more common Skutch (Auk, 1944, pp. 61-88) has made an extended study of it. He found that

the prong-billed barbets were mainly vegetarian, eating berries and larger fruits, and also flower petals. Both of these foods when large were held against a branch under one foot while fragments were torn off with the strong bill to be swallowed. In addition to the rattling chatter that I had heard he identified "a deep, far-carrying, somewhat throaty call, not unmelodious in the distance, sounding somewhat like the syllables *cwa cwa cwa* rapidly repeated many times over." This was often the utterance of several birds together, sometimes of male and female, the voice of the latter being weaker. He

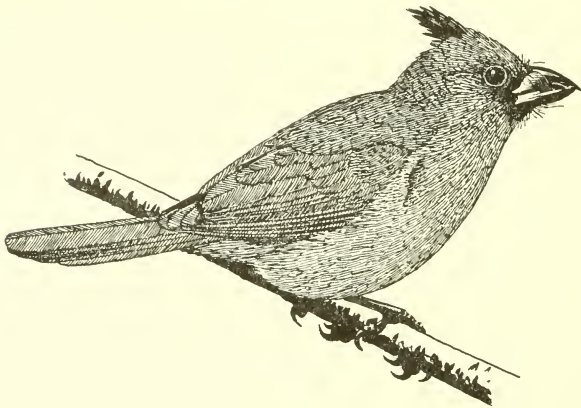


FIGURE 63.—Prong-billed barbet, male, cacareón, *Semnornis frantzii*.

was especially interested to find that outside the nesting season several joined at night to sleep in holes in trees that served as communal dormitories. Seven came regularly to one rather small cavity. Later he found 16 using another, where they must have slept in crowded company.

Toward the end of March the birds were in pairs, and then began to excavate their nest holes. For this they chose dead trees or dead branches where the wood had softened, but still was firm. The pair alternated in this work in the beginning, clinging woodpecker-fashion rather awkwardly to the site, located 3 to 18 meters or so above the ground, while with strong bills they bit out fragments of wood. The entrance passage was 5 to 8 centimeters long before the excavation, still narrow, turned downward and expanded. One nest that

he was able to examine held 4 eggs, another 5 eggs, in color white. Male and female covered the eggs alternately during the day. Both slept in the nest hole at night, and continued this after the eggs had hatched. The young were fed on small insects at first, but as they grew older the food was mainly berries and fruit pulp. On hatching the young were completely naked.

In Costa Rica these birds are called *cacareón* or *gallinita* from their calls which suggest those of the domestic fowl. Another name, of less certain derivation, is *cócora*.

The generic name for this interesting bird has been subject to argument. It was described originally by Sclater in the genus *Tetragonops*, which included also the larger species *ramphastinus* of western Colombia and Ecuador. Richmond (Auk, 1899, p. 77) pointed out that *Tetragonops*, proposed by Jardine (Edinburgh New Phil. Journ., vol. 2, October, 1855, p. 404), was antedated by *Tetragonops* Gerstäcker (Monatsb. Akad. Berlin, February or March, 1855, p. 85) for a genus of Coleoptera. He, therefore, proposed the name *Pan* to replace it. *Pan*, however, had been listed by Oken in 1816 in his Lehrbuch der Naturgeschichte, volume 3 (Zoologie) for a group of mammals. Richmond (Auk, 1900, p. 179) in accordance with this named the bird genus *Semnornis*, which since has been the current name. Oken's work, however, is of such a nature, and so uncertain in its terminology, that after considerable discussion the International Commission for Zoological Nomenclature in Opinion 417, in 1956, rejected its availability for nomenclatural purposes. This action might seem to have made *Pan*, proposed by Richmond in 1899, available for this group of birds, as suggested by Blake (Fieldiana: Zool., vol. 36, 1958, p. 524). However, the status of *Pan* Oken is under further discussion with the International Commission; in view of this it seems appropriate to list the species in *Semnornis* in accordance with current usage.

The type specimen bears a printed label marked "Costa Rica (San Jose) Dr. A. von Frantzius." To this is added in ink the collector's number 83. Deignan (U.S. Nat. Mus. Bull. 221, 1961, pp. 205-206) noted that this skin is entered in the museum catalog as from "San Carlos," a point far distant to the north, toward Nicaragua. It appears that this attribution may have been an error by the person who made the catalog entry. The bird under discussion is listed immediately after 4 specimens collected by Julián Carmiol at San Carlos. The place name is written for the first of these, with ditto marks for the next three. These marks then continue in unbroken

line for 2 birds attributed to "Dr. Von Frantzius." The first of these 2 is the type. It seems appropriate to accept the type locality "as near San Jose" as marked on the label.

Family RAMPHASTIDAE: Toucans, Tucanes

This family of about 40 species is found in tropical America from southern México to northern Argentina, Paraguay, and southern Brazil. Six of the group are represented in the forests of Panamá. All are marked by large bills, that appear oversized compared to those of most other species, in some being especially long and swollen. The structure is peculiar as in spite of size it is light in weight. The thin shell of bone that gives the expanded form is supported by series of thin, narrow struts and cancellous bony tissue that afford it support without being heavy. The horny outer covering in most is deeply pigmented, striking in brilliant color or in pattern. There have been numerous lengthy discussions to explain this curious development, which, simply enough, seems merely to be one strangely ornamental that is not inconvenient or detrimental to the activities of those that possess it, and, therefore, a detail incidental in their history in evolution.

Toucans are forest inhabitants most common in the tropical lowlands, but with species adapted to life in the cooler air of mountain woodlands. Primarily they are fruit and berry eaters, but are not strictly vegetarian as they take large insects, small reptiles, and amphibians. They also relish eggs and young of other birds, possibly to a greater extent than recorded observations indicate.

The life history of very few species is known as yet in detail, for study of them is difficult in the heavy cover where toucans live. Smaller species are known to sleep, often several together, in hollows in trees, and to nest in similar locations. It is supposed that this may be true with others. The caudal vertebrae in all are flexible, so that in sleeping posture the tail is thrown upward flat against the back to cover the head and bill that are turned sidewise among the dorsal feathers.

The group is one that is assumed to have had its origin in South America during the period when that continent was isolated from more northern land connections. On this basis the species of Central America are presumed to have moved northward during late Pliocene and Pleistocene time. It is interesting that in Panamá none have been established on Isla Coiba or in the larger islands of the

Archipiélago de Las Perlas. The only fossil records to date are from the Pleistocene of Brazil.

KEY TO SPECIES OF RAMPHASTIDAE

1. Throat and foreneck yellow; form large, robust; nostrils opening on posterior face of raised base of maxilla 2
 Throat and foreneck black or grayish blue; smaller, form slender; nostrils opening on upper surface of maxilla at base 3
2. Tip of bill red, or orange-red; smaller.
 Keel-billed toucan, *Ramphastos sulfuratus brevicarinatus*, p. 521
 Tip of maxilla yellow, of mandible black (in some narrowly tipped with yellow); larger.
 Swainson's toucan, *Ramphastos swainsonii*, p. 524
3. Breast, abdomen and sides green; throat blue.
 Emerald toucanet, *Aulacorhynchus prasinus*, p. 505
 Throat and foreneck black 4
4. Breast black, under tail coverts red; back and rump dull green.
 Cassin's araçari, *Selenidera spectabilis*, p. 518
 Upper breast yellow, more or less washed red; under tail coverts brown, mixed lightly with yellow or red; back black, rump red 5
5. Maxilla, except at base and tip, buffy white; cutting edge strongly and heavily notched; lower breast with a narrow band of black mixed with red.
 Collared araçari, *Pteroglossus torquatus torquatus*, p. 510
 Maxilla, except at base and tip, bright red or orange-red; cutting edge lightly notched; lower breast and abdomen with a broad band of red.
 Frantz's araçari, *Pteroglossus frantzii*, p. 514

**AULACORHYNCHUS PRASINUS (Gould): Emerald Toucanet,
 Currutaco**

FIGURE 64

Pteroglossus prasinus Gould, Proc. Zool. Soc. London, pt. 2, November 25, 1834, p. 78. (Valle Real, Veracruz, México.)

A small toucan, mainly green in color; throat blue.

Description.—Length 285-320 mm. Sides of maxilla concave from the nostril forward for two-thirds of length. Adult (sexes alike), crown and hindneck olive-green to brownish olive; rest of upper surface, including basal two-thirds of tail, plain grass green, the rump in some slightly yellowish green; distal third of tail changing through bluish green to dull blue, tipped with cinnamon-rufous; primaries and secondaries sooty black, the latter with the outer webs grass green like the back; space surrounding the eye and side of head below, chin, and upper foreneck rather dull blue, becoming brighter on the foreneck; auricular region, side of neck, and rest of under

surface green, changing to yellowish green on lower breast and sides, yellow on the abdomen; under tail coverts cinnamon-rufous; under surface of tail black, except for the cinnamon-rufous tip; under wing coverts and bases of flight feathers light yellow, tinged more or less with green.

Juvenile plumage, in birds recently from the nest, like that of the adult in color and pattern, except that the throat patch is grayer and duller.

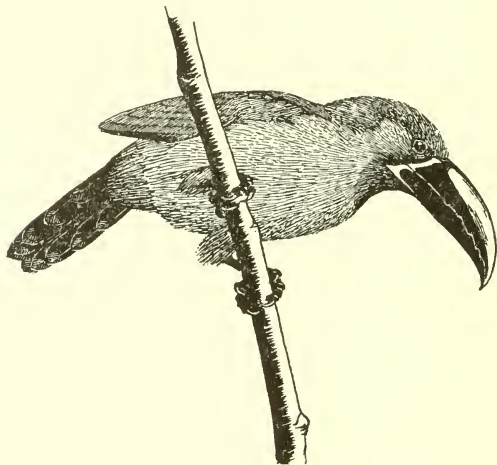


FIGURE 64.—Emerald toucanet, currutaco, *Aulacorhynchus prasinus*.

The species as a whole ranges in mountain forests from southern México through Central America, and northern South America from Colombia to Perú and western Venezuela. The most striking differences in the several forms that are recognized are in the color of the throat, which varies from pale yellow to white, gray, or blue, according to locality. Two subspecies, both with blue throats, are found in Panamá, one in the east and one in the west. Gould described the emerald toucanet in a review of toucans before a meeting of the Zoological Society of London held July 8, 1834. His account, issued in volume 2 of the Proceedings of the Society, was published November 25, 1834. At the end is the statement that "the species characterized above are figured in Mr. Gould's 'Mono-

graph of the Ramphastidae' which is just completed." While the original description is listed here from the Proceedings, it seems possible that this was antedated by an earlier appearance in the monograph. There is now no certain date known for the monograph except for the year.

AULACORHYNCHUS PRASINUS CAERULEOGULARIS (Gould)

Aulacorhamphus caeruleogularis Gould, Zool., vol. 11, April 1853, p. 3861.

("Veragua," restricted here to Boquete, Chiriquí.)

Aulacorhynchus caeruleogularis maxillaris Griscom, Amer. Mus. Nov., no. 141, October 31, 1924, p. 2. (Guayabo, Costa Rica.)

Characters.—A mark across the base of the culmen in front of the nostrils varying from broadly black in the center with a suffusion or spot of dull red on either side, to a band of dull red divided in the center by a narrow black line; somewhat larger; averaging faintly lighter in color above (but with much variation).

A male collected on Volcán Barú, Chiriquí, March 10, 1965, had the iris dark brown; bare skin around eye somewhat bluish slate; basal half of the line of the culmen broadly black, bordered at the base on either side by a rectangular spot of wine-red that extends back around the nostril; side of maxilla from base nearly to the tip, and mandible (except as indicated) black; maxilla, except for the marks described at the base of the culmen, yellow; a narrow vertical line on base of bill yellow on the maxilla, becoming white at the gape, extending thus across the base of the mandible, and as a narrow line along the under margin of each ramus forward to the level of the base of the gonys; tarsus and toes light dull green; claws neutral greenish gray.

Measurements.—Males (10 specimens from Chiriquí), wing 121.1-132.8 (123.8), tail 93.3-115.6 (103.0), culmen from base 59.6-71.2 (67.3), tarsus 31.5-36.0 (33.7) mm.

Females (10 from Chiriquí and Costa Rica), wing 114.0-121.2 (117.4), tail 89.5-102.0 (96.0), culmen from base 51.2-62.0 (55.0), tarsus 32.0-34.0 (33.0) mm.

Resident. Common in forested areas of the Subtropical Zone in the mountains of Chiriquí and Veraguas. (Sight records for Cerro Campana, western Province of Panamá). Found regularly in Chiriquí from 1,250 to 1,825 meters, less commonly to 2,375 meters on Volcán Barú.

On March 19, 1951, I saw 1 fly across a road in heavy forest at 900 meters on Cerro Campana. Others have reported them here

but as yet none have been taken. Toucanets usually range in small groups of 6 to 8 that move in loose company through leafy branches from the higher undergrowth to the canopy of leaves in the tree crown above. Although they are forest birds they often frequent the borders of clearings. Where tree cover remains in coffee fincas this is attractive, and they also range through second growth when this has attained moderate size.

Their food is mainly the berries and fruits that abound in their habitat, varied to some degree with insects. The feeding trees that are attractive to many forest birds are visited constantly. In such situations at times I have found them quite fearless. They also are regular nest robbers that take eggs and young of smaller birds. On one occasion at a berry tree that was attracting many of the smaller birds 3 toucanets fed undisturbed in the lower branches though one by one I shot half a dozen of their companions, some of which fell past them close at hand.

Their usual notes are grunting calls, often amusing in their cadence. They also utter another steadily repeated single note in sound like the call of the keel-billed toucan, but without carrying power, being far less loud.

Alexander Skutch (Wilson Bull., 1944, pp. 133-151; Publ. Nuttall Orn. Club, no. 7, 1967, pp. 51-59) in detailed studies of this species in Costa Rica recorded their nests in old holes of the larger and medium-sized woodpeckers. While the toucanets used the older cavities of previous years, at times they also dispossessed the owners when these homes had been newly completed. With species of the size of the hairy woodpecker the toucanets sometimes enlarged the entrance by pulling off fragments where the wood was soft. Two of the 3 nests that he was able to examine held 4 white eggs each, the other 3, resting on small wood fragments in the bottom of the cavity. He was not able to handle these, as to do so he would have had to enlarge the opening, adding to the already high probability of destruction by predators.

Male and female alternated in incubating during the day, with one alone during the night. In one nest the eggs hatched in 16 days. The newly emerged young were completely bare of any feathering. In the succeeding period of rather slow growth of 43 days before the young left the nest, one of the parents slept with them each night. Though the young were fed on various fruits with large indigestible pits or seeds, the parents kept the nest cavity clean. Skutch was of

the opinion that, except for the nesting period, the adult birds slept in the open and not in holes.

The country name *currutaco*, a dandy, presumably is given from the smooth, green plumage, decorated with blue on the throat and chestnut on the tail. In Costa Rica these birds are known as *curré* or *curré verde*.

Gould, who described the nominate form, exhibited it with a number of other toucans at a meeting of the Zoological Society of London on April 11, 1853. He submitted his account to the Proceedings of the Society, which have been cited usually as the place of publication, but this was not issued until July 25, 1854. A duplicate statement appeared without delay in the Zoologist for April 1853. In this it is stated that "Mr. Gould took occasion to describe a very singular addition to those previously known, conspicuously marked by a patch of bright blue on the throat; it belongs to the genus *Aulacorhamphus* and receives the name of *A. caeruleogularis*. It was collected in Veragua by Mr. Seeman during the voyage of H. M. Surveying Ship, Herald." As this antedates the account in the proceedings of the Zoological Society of London by more than a year, it is the place of original description.

Griscom (Amer. Mus. Nov. no. 141, 1924, p. 2) with limited material named a race *maxillaris* from Costa Rica, separated from that of western Chiriquí and Veraguas mainly on the basis of a greater extent of red at the base of the culmen. The numerous specimens now available show that this supposed distinction does not hold. Both stages are found in birds from Boquete, for example, so that *maxillaris* must be listed as a synonym of nominate *caeruleogularis*.

In this same account Griscom designated Cerro Flores in eastern Chiriquí as the type locality of *caeruleogularis*. This, however, was in error. As noted above, Gould stated that his type had been collected by Seemann. Berthold Seemann, in a two-volume *Narrative of the Voyage of H.M.S. Herald During the Years 1845-51 Under the Command of Captain Henry Kellett, R.N.C.B.*, published in 1853, describes a journey in western Panamá in the latter part of 1846, a second trip in the same area in early 1848, and finally a third in the "canton of Alanje." In this latter journey he says that he continued to Boquete, "a farm situated on the extinct volcano of Chiriquí," which, he added, he had visited also the previous year. Boquete is the only section that he mentions where he was within the mountain haunts of this toucanet, which locates the type locality as designated above in the heading under the race *caeruleogularis*.

AULACORHYNCHUS PRASINUS COGNATUS (Nelson)

Aulacorhamphus caeruleigularis cognatus Nelson, Smithsonian Misc. Coll., vol. 60, no. 3, September 24 (27), 1912, p. 4. (Head of Río Limón, 1,525 meters elevation, Cerro Pirre, Darién, Panamá.)

Characters.—Base of culmen black; slightly smaller; averaging faintly darker green above, but in this character variable.

In an adult male taken on Cerro Malí, Darién, February 22, 1964, the broad base of the maxilla across the nostrils, the posterior third of the line of the culmen, the lower half of the sides forward through the most anterior notch on the cutting edge, and the entire mandible (except at extreme base) were black; rest of maxilla (except extreme base) yellow; narrow, raised edge on base of maxilla from nostril to gape bright yellow, with the posterior margin narrowly black; posterior base of mandible white, this color extending forward in a narrow line on the thin edge of the rami for half their length, with the posterior margin narrowly black; back of tarsus dull blue, anterior face and toes dull green; claws dull greenish gray, with a line of black along distal half of upper margin.

Measurements.—Males (10 from Darién), wing 115.0-121.8 (118.4), tail 93.2-105.5 (95.0), culmen from base 62.2-67.1 (64.4), tarsus 33.0-35.8 (34.6) mm.

Females (6 from Darién and northern Chocó), wing 114.7-120.4 (116.6), tail 90.5-99.8 (95.0), culmen from base 51.5-56.0 (53.8), tail 31.5-34.3 (32.8) mm.

Resident. Found on the higher ridges of Cerro Pirre, Cerro Malí, and Cerro Tacarcuna, Darién.

In the latter part of February and early March 1964, toucanets were present daily around our camp on the crest of the ridge of Cerro Malí, and were seen regularly in the forest over the slopes of Cerro Tacarcuna. Through the afternoon hours when I was occupied with specimens and records, their calls came constantly from the borders of the clearing, the usual low *crik crik crik* repeated as steadily as the calls of the keel-billed toucan, but with the monotonous tone broken by low, grunting notes. In the late afternoon of February 29 one spent some time in investigating possible nest holes in a dead stub.

PTEROGLOSSUS TORQUATUS TORQUATUS (Gmelin):
Collared Araçari, Pichilingo

FIGURE 65

Ramphastos torquatus Gmelin, Syst. Nat., vol. 1, pt. 1, 1788, p. 354. (Veracruz, México.)

A slender-bodied toucan, with narrow graduated tail; maxilla mainly white or yellowish white; band on lower breast narrow.

Description.—Length 390-440 mm. Serrations on cutting edge of maxilla coarse with the large notches marked with black. Adult male, head and neck on both upper and lower surfaces glossy, somewhat greenish black; narrow collar across base of hindneck cinnamon-rufous; back, scapulars, and wing coverts slightly glossy olivaceous-black; lower back, rump, and upper tail coverts bright red; tail with shaft lines black, rest of feathers olivaceous-black; wings black, edged with olivaceous-black; under surface yellow, washed more or less with red on breast; upper breast with a central spot of black, variable in size; upper abdomen with a band of red mixed with black, variable in width, and in extent of black; under tail coverts sulfur-yellow mixed with light red; tibia cinnamon-rufous or rufous; under wing coverts white to grayish white, or pale yellow; bases of flight feathers dull yellowish white.

Adult female like male, except for a small spot of rufous hidden on the bases of auricular feathers.

Juvenile, cutting edge of maxilla smooth in early stages, with notches developing as the bird matures; otherwise like adult.

A male, taken at Armila, San Blas, March 10, 1963, had the iris bright yellow; bare skin on side of head surrounding the eye and extending forward to the base of the maxilla reddish orange; an indistinct ring on edge of eyelids fuscous-black; culmen, tip of maxilla, bases of notches on cutting edge, and entire mandible black; side of maxilla dull buffy white, shading through dull green to dull reddish brown at base; a narrow but prominent line completely around the base of the entire bill clear yellowish white; tips of notches on edge of maxilla clear yellowish white; tarsus and toes dull green; claws black.

Measurements.—Males (10 from Panamá) wing 139.9-151.2 (145.7), tail 144.2-161.0 (155.5), culmen from base 90.6-114.8 (102.2), tarsus 36.1-39.3 (37.6) mm.

Females (10 from Panamá and eastern Costa Rica) wing 137.0-148.9 (144.4), tail 142.2-156.0 (152.8), culmen from base 86.4-106.2 (96.2), tarsus 35.2-36.2 (35.8) mm.

Resident. Found on the Pacific slope from the western Canal Zone eastward through eastern Province of Panamá and Darién to the boundary with Colombia; on the Caribbean side from western Bocas del Toro to far eastern San Blas (Puerto Obaldía); to 600 meters on the Boquete trail, Bocas del Toro; 550 meters on Cerro Pirre, Darién.

In the Canal Zone the collared araçari is common on the Atlantic

side and is seen regularly on Barro Colorado Island. On the Pacific side, though it is recorded from Fort Kobbe, the K6 road, Cocolí, K2 road, and Fort Clayton, it seems to be less regular in occurrence, coming possibly from the Atlantic side when wild fruits are abundant in forest areas. The records range from July to September, with 1 for K6 on November 2.

While the form of the bill in these birds is immediate indication that they are members of the toucan family, the slender body and the

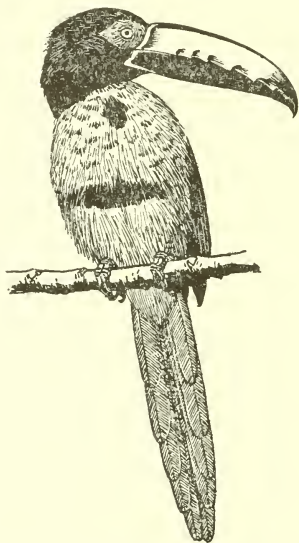


FIGURE 65.—Collared araçari, pichilingo, *Pteroglossus torquatus torquatus*.

long tail distinguish them from the common larger species. Collared araçarís usually are found in small groups of 5 or 6 individuals, rarely more, that range in the forest canopy. As they move about quietly, and are concealed by leaves, they may often pass unnoticed. When they come to the border of trees at the side of a clearing, however, it is usual for them to fly out one at a time, so that they cross the opening in a straggling line in direct flight rather than in a flock. They fly easily and seem to move more rapidly than the larger, heavier bodied species of the family. Their calls are not loud though often

given rapidly and excitedly. Their food is mainly berries and fruits so that they come to feeding trees in company with other species.

At night the small companies in which they range by day sleep in cavities in trees, sometimes in those that seem of a size too small to accommodate them comfortably. Because of this habit the tip of the long tail usually is broken or frayed, except when the feathers are newly grown. Van Tyne (Univ. Michigan Mus. Zool. Misc. Publ. 19, 1929, p. 20) on Barro Colorado Island found 3 or 4 of these small toucans using a woodpecker hole about 5 meters from the ground in a dead tree for a dormitory. As each one entered it folded the long tail flat against the back. Skutch (Condor, 1958, pp. 201-207) made similar observations, but in this instance the toucans were sleeping in a hole in a dead tree standing in the water near the shore of the island. He found another dormitory used by 6 birds in a horizontal limb of a huge forest tree 30 meters from the ground. Here the entrance hole was on the underside of the limb. Later these quarters were used for a nest with 1 bird as an occupant. Detailed examination was impracticable due to the height of the tree. But later, when the eggs had hatched he recorded 4 and 5 adults bringing food to the young, and also sleeping in the cavity. From final observations it was believed that 3 young were produced in this nest, which would indicate that one pair had served as parents, with the others bringing food as helpers. The young when small were fed on insects. Later they were given fruits of several kinds, some of them of fair size. Pits and other remains were removed from the nest cavity, as a measure of sanitation.

A record by Van Tyne (Univ. Michigan Mus. Zool. Misc. Publ. 27, 1935, p. 25) of nesting in the slightly smaller but otherwise closely similar subspecies *Pteroglossus torquatus erythrozonus* Ridgway of the Yucatán Peninsula and Petén provides further data in this species. A nest, found by Van Tyne's companion Adolph Murie at Uaxactún, in northern Petén, was in a hole about 13 meters above the ground in a large limb of a tree standing at the border of a clearing. Three white eggs lay on a "mass of fruit pits" in the bottom of the cavity which was about half a meter deep. The eggs "measured 30 by 24 mm., 29.5 by 23 mm., and 28 by 22.5 mm." As they were heavily incubated they could not be saved.

Throughout Panamá the species is known as the *pichilingo*, sometimes shortened to *pichilin*.

Through oversight Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1896, p. 556) included David, Chiriquí, in the range of *Ptero-*

glossus torquatus with reference to a specimen from Hicks. The bird in question, in the collections of the U.S. National Museum is the related species *P. frantzii*.

The present race has a broad range from southern México through Panamá and the whole of northern Colombia, with exception of the Yucatán Peninsula and northern Petén, where a smaller, paler form *A. t. erythrozonus* is found, and a limited area in Chiriquí and south-western Costa Rica inhabited by the species *P. frantzii*.

The closely allied *Pteroglossus sanguineus* is found in northern Chocó, where it has been recorded by Haffer (Amer. Mus. Nov., no. 2294, 1967, pp. 27-36) near Juradó, on the upper Río Juradó, on the Río Salaquí, and at Sautatá near the Panamanian boundary. It is possible that it may be found on the upper Río Jampavadó which heads on the Darién side of the boundary, and flows southeast to join the Río Juradó about 10 kilometers above its mouth. This bird is similar in general to nominate *torquatus*, but differs in lack of the chestnut collar on the hindneck, and in bill color, in which the maxilla has a distinct black band along the side and the tip yellow. In *torquatus* the distal end of the maxilla is black and the side yellow, except for black shading on the notches along the cutting edge. Haffer has found *torquatus* and *sanguineus* hybridizing in a limited area where they meet north of Turbo, on the eastern shore of the Golfo de Urabá, and at Sautatá on the lower Río Atrato. In his diagram (fig. 7) he has plotted a similar zone of mixing where the two may meet in the Juradó area on the west coast.

PTEROGLOSSUS FRANTZII Cabanis: Frantz's Araçari, Cusingo

FIGURE 66

Pteroglossus Frantzii Cabanis, Sitzungsab. Ges. Naturforsch. Freunde Berlin, November 19, 1861 (page not numbered). (Monte de Aguacate, Costa Rica.)

Like the collared araçari, but with maxilla red to orange except at base, and a broad band of red across lower breast and abdomen.

Description.—Length 390-440 mm. Serrations on cutting edge of maxilla small, with the notches less prominent than in *P. t. torquatus*. Adult (sexes alike), head and neck glossy black; narrow collar across base of hindneck dark chestnut; back, scapulars and wing coverts olive greenish; lower back, rump, and upper tail coverts bright red; tail olivaceous-black, with the shafts of the feathers plain black, the two central pairs, and to a lesser extent the next pair adjacent, tipped with cinnamon-rufous (a mark that is lost when the feather becomes worn and abraded); under surface yellow, washed with red on breast;

upper breast with a central spot of black (variable in size); a broad band of red across the lower breast and upper abdomen, usually with an indefinite line of black along upper margin; tibia chestnut; under tail coverts yellow, mixed with red, in some with rufous; under wing coverts light brownish gray distally, dull yellowish white internally; bases of wing feathers basally pale dull cinnamon.

Juvenile, cutting edge of maxilla smooth, and color of bill duller, less red.

An adult male, taken at El Volcán, Chiriquí, March 16, 1965, had the iris yellow; bare skin of eyelids and the broad, bare loreal area in front dull black, except for an indistinct line of pale dull buff across the center of the lower lid; remainder of bare area on side of head above and below eye (concealed in part by small scattered feathers) dull red; bare skin of gular area dull honey yellow; basal two-thirds of culmen, and all of mandible except tip, black; rest of maxilla bright red, shading to dull green on the center of the base; narrow, notched teeth on cutting edge dull black, with the notches dull white; tip of mandible pale greenish white, with an elongate spot of dull red on the gonys; a narrow line of yellowish white completely around the entire base of the bill, with an indistinct posterior border of light bluish slate; tarsus and toes rather dull green; claws black; underside of toe pads dull white. Another male, less highly colored, taken at Puerto Armuelles, Chiriquí, February 24, 1966, had the iris light yellow; edge of eyelids, lores, and bare skin above and below eye dull slate, with a faint greenish tinge; upper edge of lower eyelid and bare skin on side of head red; center of eyelids pale dull yellowish brown; culmen black except for distal third; a spot of yellowish green on side of base of maxilla, shading to orange for posterior third of maxilla and then to red for the rest; a line of dark red along the cutting edge, except that the toothed processes are dull yellowish white, with the anterior three centrally gray; all edged with dull black; mandible black with a faint tinge of brownish red; a slightly raised line of pale dull yellow, bordered posteriorly by a narrow margin of dull grayish green, around the entire periphery of the base of the bill; inside of mouth dark reddish brown, with a line of dull pinkish red along the center of the under surface of the maxilla; tongue dull buffy brown; tarsus and toes grayish green; claws dull black; lower surface of toe pads dull buffy yellow.

A female, at El Volcán, Chiriquí, February 25, 1954, was generally similar, but with the iris bright yellow; center of lower eyelid dull orange; loreal space, free edge of lower eyelid, and a line around the

base of the lower eyelid dark neutral gray; bare skin above and behind eye rose-red, shading to dull orange along upper margin; anterior half of maxilla red, shading to orange posteriorly.

Measurements.—Males (11 from Chiriquí and Costa Rica) wing 139.0-152.7 (147.3), tail 133.9-156.3 (148.4), culmen from base 103.3-123.5 (113.1), tarsus 35.7-40.7 (37.4) mm.

Females (10 from Chiriquí and Costa Rica), wing 143.4-151.0 (147.1), tail 133.5-160.0 (150.3, average of 9), culmen from base 99.8-115.7 (104.9), tarsus 35.0-40.4 (37.6) mm.

Resident. Locally fairly common from western Chiriquí near the Costa Rican boundary east to near San Félix; to 1,350 meters at Santa Clara and near El Volcán; regularly to 900 meters below

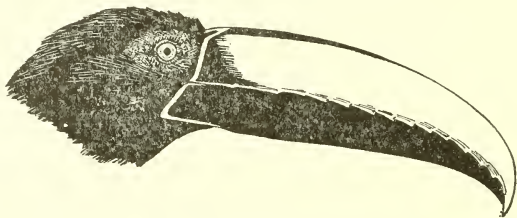


FIGURE 66.—Head of Frantz's araçari, cusingo, *Pteroglossus frantzii*, to show notches on cutting edge of maxilla.

Boquete, with 1 record for 1,600 meters at Velo, above the Finca Lérida, and another at 2,200 meters above Cerro Punta; recorded east to southwestern Veraguas.

On June 8, 1953, I saw 2 on the Río Vidal below Puerto Vidal, western Veraguas, a point approximately 5 kilometers from the boundary with Chiriquí. Griscom and Boulton collected a female on the lower Río San Lorenzo west of Punta Brava in southern Veraguas, April 8, 1924.

The first record for the Republic was published by Lawrence (Ann. Lyc. Nat. Hist. New York, vol. 8, Nov., 1865, p. 179) under the name *Pteroglossus erythropygius*, based on a female in the Smithsonian collection taken by Fred Hicks at David, Chiriquí, in February 1865. Salvin (Proc. Zool. Soc. London, 1870, p. 211) identified it correctly as *frantzii* from specimens (now in the British Museum) collected in 1869 by Arcé at Bugaba. Bangs (Auk, 1901, p. 360; Proc. New England Zool. Club, 1902, p. 32) added further records from birds

collected by W. W. Brown, Jr., at David and Divalá in October and November 1900, and from 900 meters elevation near Boquete, in January 1901. Specimens in the California Academy of Sciences collected by Mrs. Davidson Terry on December 5 and 8, 1931, extended the range to near San Félix, eastern Chiriquí. She secured the species also at 1,650 meters at Salto, above Boquete. In my own studies I have found this arazari above Cerro Punta, on Cerro Pando, and near El Volcán, to the Santa Clara region farther west near Costa Rica. I have recorded it regularly also in lowland localities on the Río Escárrea near Santa Gallo, below Alanje, and from near Puerto Armuelles to Punta Balsa at the end of the Burica Peninsula. Clearing of broad areas formerly forested must have greatly reduced its total number in recent years.

When seen in the field at any distance this toucan is similar to the more widely distributed *pichilingo*. The birds range in pairs or small groups that feed on figs, guayavas, and other fruits. Often they are quite tame. In flight the wings move quickly until the body has momentum, when alternately they flap and sail. I have found their calls and habits in general a duplicate of those of the other species.

In an account of the life history Skutch (Condor, 1958, pp. 207-218) recorded them sleeping in pairs or groups in large woodpecker holes and other cavities in standing trees. It was his opinion that they did not mate until about 2 years old, perhaps older. In 1 nest he recorded 2 white eggs laid in a woodpecker hole on a bed of seeds regurgitated from their food. During incubation one bird remained with the eggs during the night, but when the young hatched both parents slept with them. At El General, Costa Rica, he found that they reared a single family during the nesting season. They were recorded as predatory on the eggs and young of other birds, though other hole-breeding species often nested as close neighbors without molestation, even in holes in the same trees.

Beyond Panamá these toucans continue on the Pacific slope of southwestern Costa Rica north as far as the railroad line to Puntarenas, ranging inland in the Subtropical Zone to about 1,350 meters in the Candelaria and, probably, the Dota mountains (Slud, Bull. Amer. Mus. Nat. Hist., vol. 128, 1964, pp. 184-185).

While closely allied to the more widely distributed *Pteroglossus torquatus*, with which Peters and others have placed it as a subspecies, *frantzii* differs structurally in the notching of the commissure in the maxilla, less strikingly in the broad red band across the lower breast and abdomen, and in life in the bright red and orange maxilla. Actually

frantzii in the notching on the bill has closer resemblance to *Pteroglossus sanguineus* of western Colombia and northwestern Ecuador, and to *P. erythropygius* of western Ecuador. These, however, differ in lack of the brown semicollar on the hindneck.

The species was named for Dr. Alexander von Frantzius who made extensive ornithological collections in Costa Rica.

SELENIDERA SPECTABILIS Cassin: Cassin's Araçari, Pichilingo Prieto

FIGURE 67

Selenidera spectabilis Cassin, Proc. Acad. Nat. Sci. Philadelphia, vol. 9, 1857, p. 214. (Cocuyos de Veragua, Caribbean slope of Veraguas, Panamá.)

In slender form like the collared araçari, but slightly smaller; under surface from throat to abdomen black, with a prominent yellow stripe on the flanks.

Description.—Length 365-395 mm. Rump and upper tail coverts concolor with the back; tail not longer than the wing; cutting edge of maxilla notched lightly basally, heavily toward tip. Adult male, auricular feathers considerably elongated, yellow; crown, hindneck, and rest of side of head deep black; back, scapulars, wing coverts, rump, and upper tail coverts olive-green; tail bluish slate, with shafts black, and outer webs at base edged with dull olive-green; primaries and secondaries fuscous-black, with outer webs except in outermost primaries largely olive-green; lower surface from throat to upper abdomen black; a broad stripe of orange-yellow on flanks; longer under tail coverts chestnut, the shorter ones bright red; tibia chestnut; under surface of tail black; under wing coverts and basal area of primaries and secondaries rather dull yellow.

Adult female, crown and hindneck chestnut; auricular feathers black, only slightly elongated; otherwise like male.

An adult male taken on the lower Río Boquerón, on February 18, 1961, had the iris deep red; bare skin above eye light blue, becoming duller forward to the base of the bill; narrow band below eye, and entire bare area behind, clear light green, shading to lemon yellow on the lower part of this area forward to base of bill; narrow margin of upper and lower eyelids dark green; inside of mouth reddish orange; base of maxilla in front of nostrils dark yellow, shading to dull, light green on culmen and sides of maxilla; base of maxilla, sides to beyond the third notch from the tip, and whole of mandible deep brownish black; notches on edge of maxilla tipped lightly with horn color; tarsus and toes light blue; claws black.

An adult female collected on Cerro Chucantí, Panamá, March 9, 1950, had the iris wine-red; bare skin on side of head bright green, becoming greenish yellow from the nostril back, bordering the feathered area, and orange-yellow beneath the eye, the lower eyelid being green; bare skin behind mandible dull green; culmen shading from greenish yellow at the base across the nostrils through yellowish green in center to greenish gray at tip; sides of both maxilla and mandible dull purplish brown, becoming brownish gray on sides of mandible at base; anterior face of tarsus and toes grayish blue; posterior surface of tarsus brighter blue; claws neutral gray; under surface of toe pads honey yellow.

Resident. Fairly common to rare locally in forested areas on the Pacific slope from the Cerro Azul and the Serranía de Majé, eastern

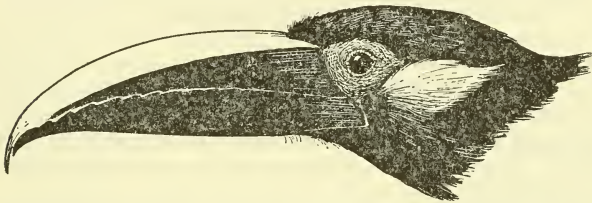


FIGURE 67.—Head of male Cassin's araçari, pichilingo prieto, *Selenidera spectabilis*.

Province of Panamá (Cerro Chucantí) through Darién (Cerro Sapo, El Real, Cerro Pirre, base of Cerro Tacarcuna, La Laguna). On the Caribbean side from Bocas del Toro (where it ranges from sea level near Almirante to Cedral at 1,460 meters on the Boquete trail) eastward through northern Veraguas, to Cerro Campana, western Province of Panamá, the western Canal Zone and the lower Chagres Valley to eastern San Blas (Puerto Obaldía).

Salvin (Proc. Zool. Soc. London, 1867, p. 157) reported it from early collections of Arcé from Santiago, Santa Fé, and Cordillera de Tolé, and later (idem, 1870, p. 211) added Calovévora. The species is known to wander to some degree in heavily forested areas, but as there are no other records for Santiago it seems possible that this record and possibly that for Tolé have been due to confusion in labels on Arcé's material. The reports for Santa Fé and Chitra are probable, as these points are across the divide from areas where the species is known.

Measurements.—Males (10 from Panamá) wing 125.8-142.7 (134.4), tail 114.4-128.8 (121.6), culmen from base 91.3-106.6 (97.9), tarsus 36.3-39.8 (37.8) mm.

Females (10 from Panamá and Chocó, Colombia), wing 130.2-139.0 (134.6), tail 113.0-123.4 (120.3), culmen from base 83.5-90.0 (85.5), tarsus 35.2-38.0 (36.6) mm.

George V. N. Powell saw several on Cerro Campana during November 1966. McLeannan sent a specimen from the northern Canal Zone to Lawrence. There is a female in the Museum of Vertebrate Zoology collected northwest of Gatun, November 2, 1947 by R. Noyes. They are regular in occurrence in the forests near Piña, west of the mouth of the Río Chagres, and in 1961 I found them on Río Boquerón above Madden Lake. Von Wedel secured several near Puerto Obaldía in the eastern San Blas.

In eastern Panamá, I saw them rather regularly on the slopes of Cerro Chucantí, in March 1950, and collected 1 from a little flock near El Real on March 21, 1964. Barbour, in April 1922, secured 4 on Cerro Sapo, and members of the Fifth George Vanderbilt Expedition collected others there in 1941. I have 1 specimen from La Laguna on the lower slopes of Cerro Tacarcuna, taken by Pedro Galindo, June 6, 1963. Goldman secured several on Cerro Pirre in April and May 1912.

The present species has its distribution in Panamá through the forests inhabited by the collared araçari, but is far less common. The two species, similar in general form but not in color, may come to the same fruit-bearing trees for food, but otherwise remain apart in separate pairs or small groups. I have noted no aggressive behavior between them, but nowhere have I found either in sufficient abundance to occasion any active competition. Their only common ground that might be competitive is in holes in trees for sleeping and nesting. Such shelters, however, appear to be sufficient in number for these and other species of similar habit.

Cassin's araçari, in contrast to the other species remains mainly in the leaf canopy of the taller trees, moving and flying through this cover. Less often does it fly across broad open spaces. Its duller color pattern on the whole, coupled with more retiring habits, afford it a certain measure of protection, so that it may be missed in casual travel through its range.

The call, a slowly repeated *krit-it krit-it*, suggests that of the keel-billed toucan, but is lower, with less carrying power, is shorter, and is not repeated as steadily. Usually, when seen they rest quietly,

seeming rather stolid, but if animated may bend quickly forward and then draw back while repeating the call note.

Stomachs of those that I have examined have been filled with fragments of fruit skins.

In observations in Costa Rica, Slud (Amer. Mus. Nat. Hist. Bull. 128, 1964, p. 185) found this species during the nesting season in higher subtropical forests, spreading down to lower levels later. I have seen no record of the nest and eggs.

The common group name of *araçari* for the smaller toucans with slender bodies is the Portuguese form of the Tupí-Guaraní word *aracari*, in which the letter "c" (without the cedilla) is given the hard sound.

RAMPHASTOS SULFURATUS BREVICARINATUS Gould:

Keel-billed Toucan, Paletón

FIGURE 68

Ramphastos sulfuratus brevicarinatus Gould, Monogr. Ramphastidae, ed. 2, 1854, pl. 3 and text. (Western side of the Isthmus of Panamá.)

The smaller of the two large-billed, black toucans with yellow fore-neck and upper breast; tip of the bill red.

Description.—Length 450-500 mm. Adult (sexes alike), crown and hindneck black, with the hindneck washed with maroon; upper tail coverts white; rest of upper surface, including wings and tail, glossy greenish black; feathered area of side of head, throat, and foreneck bright yellow, bordered on lower margin with a narrow band of bright red; under tail coverts also bright red; rest of under surface dull black.

Juvenile, without the serrations on the cutting edge of bill present in adults; coloration somewhat duller.

An adult male, taken at Armila, San Blas, March 3, 1963, had the outer ring of the iris light green, shading inward to pale brown; bare skin of side of head and across base of bill bright yellow, spotted irregularly around eye and behind nostril with green; tip of bill dark red; an elongate spot on side of maxilla pale orange-red, broad posteriorly and narrowed anteriorly, where it continues as a line across the serrations on the lower margin to join the brighter color on the tip; line of culmen, except at extreme base, pale dull yellow; rest of side of maxilla light green; side of mandible at base light green shading anteriorly to light blue; a narrow line of deep black around entire base of bill; bare skin on chin at base of gonys pale blue changing on

upper throat to light green; tarsus and toes blue; claws black; under-side of toe pads, except for distal segment, dull honey yellow.

Measurements.—Males (12 from Panamá) wing 190-205 (197.1), tail 149-168 (156.4), culmen from base 125.3-155.7 (137.3), tarsus 47.4-52.5 (49.3) mm.

Females (10 from Panamá and northwestern Colombia) wing 184-191 (189.4), tail 143.5-155.0 (148.6), culmen from base 113.7-144.8 (119.9), tarsus 45.3-50.0 (48.0) mm.

Resident. Distributed throughout forested areas in the lowlands; less common on the Pacific slope west of the Canal Zone; to 900 meters elevation in mountain areas.

The species, now uncommon in the lowlands of the Azuero Peninsula, Pacific Veraguas, and Chiriquí, undoubtedly has decreased as forests have been cleared. Through the savannas a few may be found in stands of trees along streams, or in the wet forests bordering the mangrove swamps, but there they are not common. On the eastern side of the Azuero Peninsula in Herrera I found a few in 1948 in the hills known as Los Voladores, and others in 1957 in Los Santos along the Río Oria, and in 1962 on the Río Guánico. From Cerro Azul through Darién, and along the entire Caribbean slope they are common, and on the whole are the most prominent among the larger forest birds. It is usual to find them in small groups of 6 or 8 that move about through the tops of the trees, often in early morning resting on open perches in the sun. In flight the rounded wings beat rapidly for half a dozen strokes or more, and then are held wide open for a short sail during which the bird dips suddenly downward almost as if pulled by the long bill. Their movement forward thus is strongly undulating and rather slow. Usually they move in the open for short distances only across openings over streams or small clearings. But, though the flight seems weak, it can be long sustained without difficulty, as they cross easily between distant forested ridges, or less often over extensive open lands. It is their notes that indicate their abundance, the ordinary call being a sharp *ka-trik ka-trik ka-trik*, that may be repeated steadily for periods of several minutes. At a distance this is not unpleasing, but near at hand it may become annoying through its unvarying, monotonous repetition. Other lower, rattling calls are heard when birds are near at hand.

The food is mainly fruits of forest trees, varied by cicadas and other large insects. Where some group of trees is bearing in abundance 15 or 20 of the great birds may gather to feed quietly in company with parrots, trogons, and large flycatchers.

The life history of this species was studied in detail on Barro Colorado Island by Josselyn Van Tyne (Univ. Mich. Mus. Zool. Misc. Publ. no. 19, 1929, pp. 1-43). Though the species was common it was secretive in nesting, as in detailed search through two breeding seasons Van Tyne was able to find only 5 nests. These were in holes in large trees, ranging from a little less than 3 meters to more than 25 meters above the ground, 1 nest so located in a huge tree that it could not be reached. Three of the 4 nests that were accessible

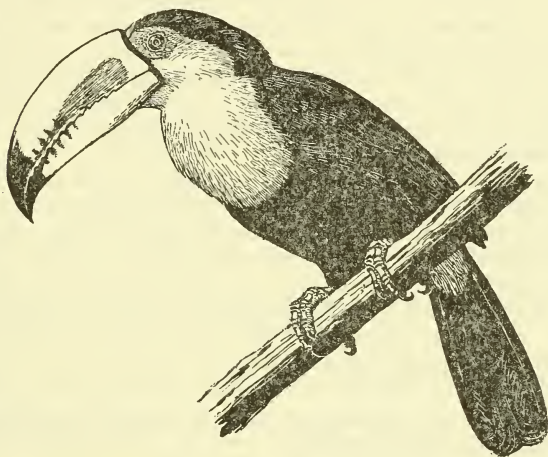


FIGURE 68.—Keel-billed toucan, paletón, *Ramphastos sulfuratus brevicarinatus*.

held 1, 3, and 4 eggs respectively. In the fourth he found a single young bird a few days old. The eggs, "are dull white in color and are curiously sculptured with irregular pitted grooves extending lengthwise along the egg, and becoming most prominent at the large end. At the small end of the egg they become less distinct or tend to disappear entirely." From the illustration (*loc. cit.*, pl. IV, fig. 7) the eggs varied from elliptical to short subelliptical in form. Measurements were as follows: 38-40.5×28-30 mm. The young on hatching were entirely naked, pinkish in color, changing in "a few hours to a peculiar golden flesh color." He noted a well-developed egg tooth.

Both male and female incubated the eggs. In addition to the usual

diet of fruit for the young once they were brought a lizard, and on another occasion part of a small snake.

Van Tyne observed an interesting play among a group of adults when two "stood in one spot and fenced with their bills for half a minute or so, rested and were at it again. . . . Presently they flew off into the forest and I then noticed two others that had now begun to fence. Then one of these flew away and the remaining one picked a new opponent and fell to fencing again. Soon the toucans began flying off . . . but one or two more contests took place before the last of them followed. . . . They fenced with and against each other's beaks and never seemed to strike at the body." This curious activity was observed on several occasions.

In Darién and elsewhere these birds were called *paletón* by those who distinguished this species from the larger *swainsonii*. It was also called *pico ají* and *pico verde*. Both of the large toucans were known collectively as *pico feo*.

Beyond Panamá the race *brevicarinatus* is found across northern Colombia to the Serranía de Perijá, and along the northern extension of this range to the base of the Guajira Peninsula. It ranges also to the eastern slopes of the Perijá in northwestern Venezuela.

RAMPHASTOS SWAINSONII Gould: Swainson's Toucan,
Dios-te-dé

Rhamphastos Swainsonii Gould, Proc. Zool. Soc. London, pt. 1, no. 4, September 20, 1833, p. 69. (Mountains of Colombia.)

The larger of the two black toucans with yellow foreneck and upper breast; tip of bill yellow.

Description.—Length 500-560 mm. Adult (sexes alike), crown, hindneck, and back black, washed with maroon, especially on the neck and upper back; upper tail coverts white; rest of upper surface, including wings and tail, somewhat glossy bluish or greenish black; lower side of head, throat, and foreneck clear yellow; a well-marked narrow band of bright red across the breast, with the feathers basally white, this showing more or less distinctly through the yellow immediately above; under tail coverts bright red; rest of under surface, including under wing coverts, black; occasionally with the maroon wash more extensive, including very faint tinges on the breast.

Juvenile, like adult, but with colors duller; cutting edge of bill smooth, without notches.

An adult male, taken on Cerro Malí, Darién, March 2, 1964, had the iris light, rather dull green; bare skin on side head bright yellow,

with a circlet of light green around the eye, and lines of the same color through the yellow area; slightly thickened rim of the eyelids black; inside of mouth rose-red; a line of light green along the culmen from near the base for five-sixths of its length, gradually shading into the yellow of the upper part of the maxilla at its forward end; several indistinct curved lines of light green across the base of the maxilla; side of maxilla from a curving line to near tip and mandible black, with a tinge of red on the basal half of the latter; a narrow black line around entire base of bill; back of tarsus and toes light blue; front of tarsus blue with a faint greenish tinge; claws black. Another male, collected at Puerto Armuelles, Chiriquí, February 10, 1966, had the iris light brownish yellow; bare skin on the side of the head and between the mandibular rami light green, tinged with yellow, except around eye; broad line of culmen, anterior end of maxilla, and extreme tip of mandible slightly orange-yellow; rest of mandible and side of maxilla dull black, with a faint reddish tinge; tarsus, including crus, and toes light blue, with the scutes on the front of the tarsus tinged with green; underside of toes dull yellow. Other details as in the bird from Cerro Malí.

Measurements.—Males (10 from Panamá and northwestern Colombia), wing 215-224 (219.8), tail 149-157 (152.1), culmen from base 135.6-173.0 (160.5), tarsus 51.4-57.2 (54.6) mm.

Females (10 from Panamá and northwestern Colombia), wing 211-233 (219.7), tail 142-163 (151.4), culmen from base 142.2-156.0 (146.7), tarsus 46.8-54.9 (52.2) mm.

Resident. Common locally in forested areas; on the Pacific slope from the Costa Rican boundary in western Chiriquí, including the Burica Peninsula, Cerro Pando, the western base of Volcán de Chiriquí to 1,250 meters near Santa Clara and El Volcán, and the coastal area to Alanje and David; also in the far eastern area of the Province of Panamá from the Río Majé east through Darién to Colombia, ranging to 550 meters on Cerro Pirre, and to 1,500 meters on Cerro Tacarcuna; on the Caribbean side on the Río Changuena, Bocas del Toro, throughout to the Colombian boundary.

The species has not been reported on the Pacific side between central Chiriquí and central eastern Province of Panamá, or from the whole of the Azuero Peninsula. In my personal field work I have found it most common in the lower Chagres Valley, and in Darién in the valley of the Río Tuira and the coastal area to the south, including the Río Jaqué.

In flight and general aspect in the forest it is closely similar to the

smaller keel-billed toucan, but in voice it is entirely different. It is also more retiring, as it tends to remain hidden and is less often seen. The call note which resembles the syllables *dios-te-dé*, *te-dé-te-dé*, while frequently repeated and one of far reaching sound, is not given as constantly or monotonously as that of the other large species. As it is uttered the bill is swung back and forth and tail is jerked up and down. It is from this note that it is given its common Spanish name of *Dios-te-dé*. The devout say that as the bird calls it makes the sign of the cross with its bill. In addition to this usual note it utters a low grunting sound, and a still lower rattle.

These toucans are mainly fruit feeders like others of the family, but also take the long filaments of the flowers of the guarumo (*Cecropia*). Skutch (Sci. Monthl., 1940, p. 506) says that they "are insatiable nest-robbers." Laughlin (Condor, 1952, pp. 138-139) saw one visit the nest of a tooth-billed kite, and, with the owner present, take one of the eggs and swallow it.

This species and the keel-billed toucan are hunted regularly by both Cuna and Chocó Indians. Bennett, in a study of the Cuna at Acandí, in Colombia (Ann. Assoc. Amer. Geogr., 1962, p. 41) in a 2-week period counted 57 toucans that were killed as food. He lists these as the keel-billed species, but I believe it probable that the larger Swainson's toucan was included, since this is the one that decoys readily. For this the hunter, Indian or Panamanian, places a bit of folded platanillo (*Heliconia*) leaf between the lips, and with it produces a loud, rasping sound that calls the birds to the trees overhead, where they peer down curiously. I have eaten the large toucans from time to time in camp when other game was scarce, and have found the meat dark in color but excellent in taste.

No report on the nesting of this species has come to my attention.

To the north this toucan ranges through Costa Rica and Nicaragua to southeastern Honduras, to the south across northern Colombia to the middle Magdalena Valley, and along the western slope to western Ecuador.

[Ridgway (U.S. Nat. Mus. Bull. 50, pt. 6, 1914, p. 339) listed Panamá in the range of the closely similar *Ramphastos ambiguus* Swainson from an ancient specimen of uncertain history as to its locality in the Museum of Comparative Zoology. This has led to inclusion of this species among the birds of the Republic by Griscom (Bull. Mus. Comp. Zool., vol. 78, 1935, p. 329), and by Eisenmann (Trans. Linn. Soc. New York, vol. 7, 1955, p. 55). This species, which is similar to *swainsonii* in size and color, differing in bill color in

which the mandible and the base of the maxilla are black, is found from Colombia and Venezuela south through Ecuador to Perú.]

Family PICIDAE: Woodpeckers; Carpinteros

Members of this family are widely distributed through the world, absent in lands suitable for their needs only from the New Guinea area, Australia, New Zealand, and Madagascar.

Species of woodpeckers in general are heavy-bodied, with straight, pointed bills, toes arranged in pairs with two pointed forward, two back, and firmly feathered tails with the ends of the feathers stiffened and pointed. They live clinging to the trunks and branches of trees, where they climb up and down, and with chisel bills dig open the tunnels in the wood where the larvae of wood-boring beetles live. These insects are drawn out of their burrows by the stiffened, hard-pointed, extensile tongue of the bird. Or insects such as ants, favored by some species, are secured by a sticky secretion of the salivary glands that covers the tongue. Numerous kinds vary such diet with berries and fruits in season, or by flying insects captured on the wing. The flickers of temperate regions in the Americas feed much on ants on the ground. Other exceptions are the three-toed woodpeckers of the Northern Hemisphere which lack the hallux in the hind toes, and the wrynecks and piculets in which the ends of the tail are soft.

Most woodpeckers dig holes that have round openings in tree trunks and branches. These holes are used as sleeping quarters, and as nests to rear their young. The pure white eggs are laid on a few bits of wood chips with no other nesting material.

All members of the family have a variety of call notes, many of them rather abrupt and harsh. In addition they drum with the bill, usually on resonant dead limbs, a tattoo that varies in delivery in different species, or groups of species. The 20 kinds of woodpeckers found in Panamá range from small, sparrow size, through medium to large and robust forms. One is a migrant that comes rather rarely during the period of northern winter.

KEY TO SPECIES OF PICIDAE

1. Tail feathers with the tips rounded, soft and flexible; size very small.
 Olivaceous piculet; *Picumnus olivaceus*, p. 529
 Tail feathers with tips narrowed, elongated, stiff, and firm; size medium to very large 2
2. Large; crest red or partly red; wing more than 170 mm. 3
 Medium size; most species without crest (where crest is present it is brown or red); wing less than 150 mm. 6

3. Outer hind toe shorter than outer front toe.

Lineated woodpecker, *Dryocopus lineatus*, p. 546

Outer hind toe decidedly longer than outer front toe 4

4. Breast, lower back, and rump red, with the partly concealed bases of the feathers barred; ends of wings spotted with yellowish white on the under surface.

Crimson-bellied woodpecker, *Campephilus haematogaster splendens*, p. 581

Upper breast, back, and rump black; under surface of ends of wings not spotted 5

5. Side of head plain, except for an indistinct brownish spot over ear; bill yellowish for distal half, in some for entire length.

Flint-billed woodpecker, *Campephilus guatemalensis guatemalensis*, p. 575

A prominent white spot at base of bill, and another of black and white over ear.

Malherbe's woodpecker, *Campephilus melanoleucos malherbii*, p. 578

6. Head with a brown crest 7

Head smooth, or with red crest 8

7. Crest long, pointed; lower back, rump, and base of tail plain, without bars.

Chestnut-colored woodpecker, *Celeus castaneus*, p. 540

Crest short, bushy; lower back, rump and entire tail barred with black.

Cinnamon woodpecker, *Celeus loricatus*, p. 542

8. Basal color of back and wings green or olive-green, in some with a yellowish or reddish wash 9

Basal color of back and wings black, in most species with markings of white 15

9. Breast and abdomen brownish olive to tawny-olive, without bars or spots.

Smoky-brown woodpecker, *Veniliornis fumigatus sanguinolentus*, p. 567

Breast and abdomen barred or spotted with black or slate 10

10. Size small, wing less than 90 mm.; under surface dull white, barred with grayish brown; rump red.

Red-rumped woodpecker, *Veniliornis kirkii*, p. 570

Larger, wing 100 mm. or more; breast and abdomen yellow or buff, barred or spotted with black; rump not red 11

11. Back barred with black; breast and rump with small spots of black.

Spot-breasted woodpecker, *Chrysophilus punctigula striatigularis*, p. 533

Back without markings; rump plain, or barred with olive, not spotted .. 12

12. Rump paler than back, greenish yellow, indistinctly barred with olive.

Golden-olive woodpecker, *Piculus rubiginosus uropygialis*, p. 534

Rump concolor with back, without markings 13

13. Breast, abdomen and under tail coverts deep buff, barred evenly with slate-black; a bright yellow streak on side of head below eye; wings without bars.... Golden-green woodpecker, *Piculus chrysocloros aurosus*, p. 539

Breast olive-green, spotted with buffy white; abdomen and sides dull white or yellowish white, barred with dark olive; wings barred with black. 14

14. A broad streak of yellowish white on side of head below eye; chin and upper throat whitish, or streaked with white.

Stripe-cheeked woodpecker, *Piculus leucolaemus callopterus*, p. 537

Side of head, chin and throat brown or olive (in males partly red).

Rufous-winged woodpecker, *Piculus simplex simplex*, p. 536

15. A broad longitudinal white stripe on outer wing coverts; a broad blotch of black across lower foreneck and upper breast.

Yellow-bellied sapsucker, *Sphyrapicus varius varius*, p. 566

Outer wing coverts without broad white stripe (in some plain, in others narrowly barred with white); upper breast and foreneck not plain black 16

16. Rump and upper tail coverts black; abdomen brown or brownish white like breast....Hairy woodpecker, *Dendrocopos villosus extimus*, p. 573

Rump and upper tail coverts white; abdomen not like breast 17

17. Chin and throat black; abdomen white; back and rump black.

Acorn woodpecker, *Melanerpes formicivorus striatipectus*, p. 550

Chin and throat not black; abdomen red centrally, barred or streaked laterally with black and white 18

18. Nape yellow; a broad white streak down center of back.

Golden-naped woodpecker, *Centurus chrysauchen*, p. 563

Nape red; back banded with white 19

19. Sides and flanks heavily barred with black; forehead yellow; side of head black....Black-cheeked woodpecker, *Centurus pucherani pucherani*, p. 561

Sides plain, flanks lightly barred with black; forehead white, in some tinged with red; side of head grayish white.

Wagler's woodpecker, *Centurus rubricapillus*, p. 553

PICUMNUS OLIVACEUS Lafresnaye: Olivaceous Piculet, Telegrafista

FIGURE 69

Picumnus olivaceus Lafresnaye, Rev. Zool., vol. 8, January 1845, p. 7. (Bogotá, Colombia.)

Smallest of the family, of seed-eater size; a woodpecker in habit, but without stiffened tail feathers so that it climbs and perches by use of feet alone.

Description.—Length 85-95 mm. Male, crown and upper hind-neck black, with short, narrow streaks of orange in center of pileum, and dots of white on posterior area; otherwise dull yellowish olive above, except for the upper tail coverts which are buffy yellow; wing coverts somewhat darker than back, edged narrowly with dull buff; primaries and secondaries grayish brown, edged with yellowish olive, except near the tips of the inner secondaries, where the bordering line is more definitely buff; middle rectrices buffy yellow, with the outer web black or partly black; rest of tail feathers black, bordered narrowly with pale buffy yellow; side of head and chin with small feathers pale buffy white to buffy yellow, edged narrowly with black; breast and foreneck light buffy olive, becoming paler on the throat; rest of under parts buffy yellow, streaked rather indefinitely with dull olive, under wing coverts light buffy yellow, the outer ones mixed with dull grayish brown.

Female; with the small dots on crown and hindneck white (without orange).

Young; crown sooty to dark grayish brown, spotted with dull white to dull buff in varying amount, in some nearly plain.

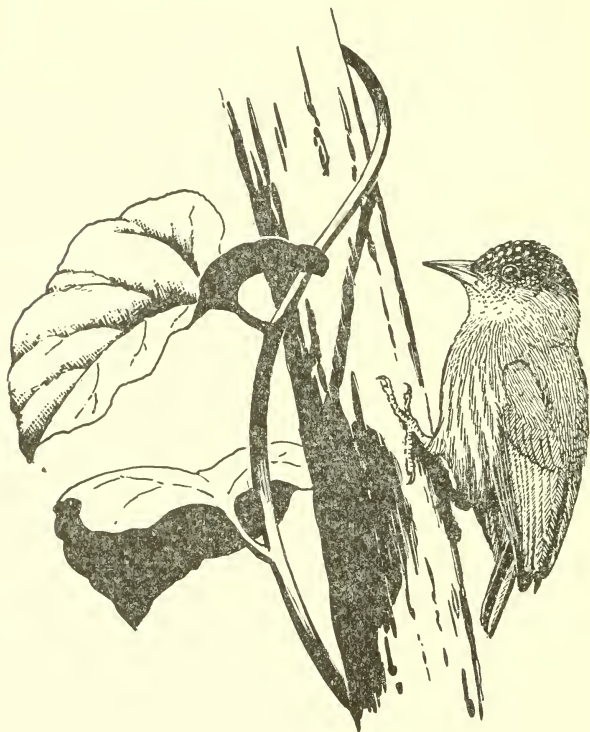


FIGURE 69.—Olivaceous piculet, telegrafista, *Picumnus olivaceus*.

The piculet in Panamá is a bird difficult to define as to its choice of any especially preferred habitat because of the wide variety of locations in which it may be encountered. It is found more often in open thickets or along forest edge where it may range low near the ground, even briefly among rank growths of weeds, or may go higher into the tree crown. On occasion I have found them moving

with groups of honey-creepers through the high leaf canopy. Almost invariably they are encountered in pairs or 4 or 5 together, the latter seemingly being family groups. In feeding they search rapidly through creepers or other cover, or at need settle down to hammer rapidly and persistently in true woodpecker style to dig out some larval morsel. The steady percussion of such efforts earns them the common name of *telegrafista*, as the sound simulates the measured rattling of the old-style telegraph instrument. This is the most audible of the sounds that they produce as the call notes are low. Other sounds, heard less often, are low and trilling. Their food is composed of a variety of insects including numerous ants.

In moving about the birds creep like nuthatches supported by the strong feet. Regularly they rest perched crosswise on small twigs in a manner common to most small birds. Skutch (Anim. Kingdom, 1956, p. 55) found pairs sleeping together in a tree hole cut out for the purpose. Young of the first brood remain with the parents while a second set of eggs is incubated and hatched, all living companionably in the nest hole.

The salivary glands in these birds are well developed, rather narrow, and extend to the back of the cranium. In one individual they were 15 mm. long.

It is probable that piculets often are overlooked in the forest because of their quiet mannerisms and low calls.

Two geographic races are recognized in Panamá.

PICUMNUS OLIVACEUS FLAVOTINCTUS Ridgway

Picumnus flavotinctus Ridgway, Proc. U. S. Nat. Mus., vol. 11, Sept. 20, 1889, p. 543. (Pozo Azul de Pirris, Costa Rica.)

Characters.—Darker above, with outer web of inner primaries and secondaries darker, more olive-green; under surface darker, grayer, less yellowish.

In a male taken at Puerto Armuelles, Chiriquí, February 8, 1966, the iris was dark brown; side of maxilla below the nostril and basal half of mandible neutral gray; rest of bill black; tarsus and toes dull greenish gray; claws dark neutral gray.

Measurements.—Males (12 from Costa Rica and Panamá), wing 50.7-53.5 (52.0), tail 23.8-28.1 (26.7), culmen from base 11.0-13.1 (12.2), tarsus 12.0-15.4 (13.1) mm.

Females (6 from Costa Rica and Panamá), wing 51.0-53.2 (51.9), tail 26.0-28.8 (27.4), culmen from base 11.6-12.7 (11.9), tarsus 12.2-13.8 (12.9) mm.

Resident. Tropical and lower Subtropical Zones on the Pacific slope from western Chiriquí (Santa Clara, El Volcán, Nueva Suiza, Concepción, Divalá, Bugaba, and Cerro Flores) to western Veraguas (Zapotillo).

One that I saw but did not secure near Tonosí in Los Santos in March 1957, may have been of this race.

The bird ranges in southwestern Costa Rica to the valley of the Río Térraba and its principal tributaries. In Panamá I have not taken it east of Zapotillo in western Veraguas (20 kilometers from the boundary with the Province of Chiriquí). I encountered it there near the small streams that reach the sea through the mangroves near the mouth of the Río Tabasará.

PICUMNUS OLIVACEUS PANAMENSIS Ridgway

Picumnus olivaceus panamensis Ridgway, Proc. Biol. Soc. Washington, vol. 24, February 24, 1911, p. 34. (Lion Hill Station, Panama Railroad, Canal Zone, Panamá.)

Characters.—Brighter, more greenish above, with the edgings of the inner primaries and secondaries lighter, more yellowish green; lighter below, with upper breast more buffy brown, and lower breast, abdomen, and sides, definitely yellow.

A male, collected near the La Jagua Hunting Club, east of Pacora, Panamá, January 14, 1962, had the iris wood brown; bill black, becoming dusky neutral gray at the base; tarsus, toes, and claws neutral gray with a faint greenish tinge; toe pads slightly yellowish.

Measurements.—Males (12 from Panamá), wing 50.1-51.2 (50.5), tail 23.8-27.0 (25.8), culmen from base 11.4-12.9 (12.0), tarsus 11.8-13.3 (12.5) mm.

Females (10 from Panamá), wing 48.1-51.5 (50.1), tail 23.4-26.7 (25.2), culmen from base 11.0-12.8 (11.9), tarsus 11.9-12.9 (12.4) mm.

Resident. Tropical lowlands from the Canal Zone (Frijoles, Gatun), east through eastern Province of Panamá (La Jagua, Chepo) to eastern Darién (Garachiné, El Real); on Cerro Pirre to the lower Subtropical Zone (Cana); on the Caribbean slope from eastern Colón (Colón, Portobelo) to western San Blas (Mandinga).

It is probable that it ranges to eastern San Blas as it is found in northern Chocó in Colombia where it has been taken at Unguía.

CHRYSOPTILUS PUNCTIGULA STRIATIGULARIS Chapman:
Spot-breasted woodpecker, Carpintero Pechipunteado

FRONTISPIECE

Chrysoptilus punctigula striatigularis Chapman, Bull. Amer. Mus. Nat. Hist., vol. 33, March 21, 1941, p. 611. (Cali, 1,060 meters elevation, Valle, Colombia.)

Chrysoptilus punctigula lucescens Griscom, Bull. Mus. Comp. Zool., vol. 69, April 1929, p. 165. (El Real, Darién, Panamá.)

Medium size; crown black, crest red, throat streaked black and white; entire side of head white.

Description.—Length 200-215 mm. Adult male, anterior two-thirds of crown black; posterior area tipped with red, the feathers with a subterminal black bar (the red tipping in some extending over the whole anterior area); prominent nuchal crest red; lower hindneck, back, wing coverts, scapulars, and inner secondaries olive-green, barred distinctly with black; rump and upper tail coverts orange-yellow, spotted lightly with black; two outermost rectrices brownish orange barred with black; others black, edged basally with dull olive-green; primaries and secondaries with shafts bright yellow; three outermost primaries black; others and secondaries dull black, with outer webs olive-green spotted with black; side of head, including lores and line over eye, white; a broad band of red on ramal area, extending down on either side of the neck; throat and upper foreneck white, with a narrow black line down the center of each feather; lower foreneck and upper breast yellowish olive, each feather with a small elliptical spot of black, some individuals with part of these feathers dull orange-red; rest of lower surface somewhat olive-yellow; abdomen plain; lower breast, sides and under tail coverts spotted lightly with black; under wing coverts and proximal area of under surface of primaries and secondaries light cinnamon-buff.

Adult female, similar, but without the red band on the ramal area and the side of the neck.

Immature individuals, somewhat duller on the lower surface.

Measurements.—Males (10 from Darién and Colombia), wing 105.6-113.0 (108.6), tail 62.4-73.2 (67.6), culmen from base 23.4-25.2 (24.3), tarsus 20.4-23.5 (22.5) mm.

Females (11 from Panamá and Colombia), wing 105.7-112.1 (108.5), tail 65.0-70.8 (67.5), culmen from base 21.5-24.2 (22.1), tarsus 21.4-23.9 (22.6) mm.

Resident. Rare; known only from single specimens from Juan Díaz, eastern Province of Panamá, and Garachiné and El Real, Darién.

The first record for Panamá is of 1 taken and another seen by Ludlow Griscom February 27, 1927, in a mangrove swamp at Garachiné, Darién (Amer. Mus. Nov., no. 282, 1927, p. 6). The following year, on January 18, 1928, Rex Benson collected a male at El Real, Darién. Griscom (Bull. Mus. Comp. Zool., vol. 78, 1935, p. 330), listed this El Real record as from Cana, through an oversight. A female in the U. S. National Museum was taken August 12, 1962, at Juan Díaz, east of Panamá City by collectors from the Gorgas Memorial Laboratory. The only other record at present is of 1 that I saw in the mangrove swamp at the mouth of the Río Chico, near Chico, Panamá, on April 4, 1948. I have looked for these birds in that area on numerous visits since, but without success.

These woodpeckers are fairly common in northwestern Colombia.

PICULUS RUBIGINOSUS UROPYGIALIS (Cabanis):
Golden-olive Woodpecker, Carpintero Verde

Chloronerpes uropygialis Cabanis, Journ. f. Orn., vol. 10, September 1862, p. 321.
(Cerro de la Candelaria, Costa Rica.)

Medium in size; green above, greenish yellow below barred with dusky; male and female with center of crown dark gray.

Description.—Length 195-220 mm. Male, entire center of crown broadly dark gray; a line on either side, nape and hindneck bright red; forehead in some also lined or washed lightly with red; back, wing coverts, and secondaries golden brown; rump and upper tail coverts dull yellow, barred with light olive; tail brownish olive, with the shafts and distal half of central rectrices black; primaries grayish brown, with the outer webs greenish brown, except on the three outermost; inner webs of secondaries grayish brown; side of head including loreal area and line above eye, brownish white, distally barred narrowly with dull black; malar stripe bright red; chin and throat dull black streaked with dull white; foreneck and breast dark yellowish olive, barred with yellowish white, becoming yellower and less heavily barred on lower breast and abdomen; edge of wing dull golden yellow; under wing coverts and bases of primaries and secondaries buffy yellow.

Female, like the male but with red of crown restricted to nape and hindneck; no red malar stripe.

An adult female taken February 26, 1962, at the head of the Río Guabal on the Caribbean slope of northern Coclé, had the iris reddish brown; maxilla and mandible except at base dull black; base of

gonys dusky neutral gray; tarsus and toes neutral gray; claws brownish gray.

Measurements.—Males (10 from Chiriquí and Veraguas), wing 117.2-123.8 (120.1), tail 61.0-70.0 (65.9), culmen from base 25.6-29.0 (27.1), tarsus 20.5-23.6 (21.9) mm.

Females (11 from Chiriquí, Veraguas, and Coclé), wing 116.5-121.8 (119.2), tail 64.2-71.3 (68.6), culmen from base 23.7-27.4 (25.5), tarsus 20.0-22.2 (21.0) mm.

Resident. Mainly from 1,250 to 1,675 meters elevation in the Subtropical Zone in Chiriquí and Veraguas; also in the Tropical Zone in dense rain forest in northern Coclé.

This woodpecker is fairly common around the volcano in western Chiriquí, ranging there in the Subtropical Zone above Boquete, near El Volcán, at the lakes, and on the slopes of Cerro Pando, farther west.

Dr. C. L. Hayward secured a male March 9, 1962, near Cerro Punta, and Dr. Frank Hartman another near Santa Clara to the west February 28, 1953. (Both birds are now in U. S. National Museum.) Arcé collected it a hundred years ago on the Cordillera del Chucú, Veraguas, a locality near Santa Fé (specimens in the British Museum). On February 26, 1962, I shot a female at my camp in the clearing El Tigre at 475 meters on the head of the Río Guabal, on the Caribbean slope of Coclé. The region was one of dense forest and heavy rainfall. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, p. 407) recorded specimens taken by Arcé at Calobre, Veraguas, and Bibalaz, Chiriquí, both lowland localities, formerly heavily forested. While the species normally is found in such haunts it also comes regularly into more open areas, even in fairly low second growth.

Skutch, in observations in Costa Rica (Wilson Bull., 1956, pp. 118-128), describes the drum of the male as a loud, rapid roll. A nest that he found April 5, in a hole in a dead stub about 4 meters from the ground held 4 glossy white eggs. The male incubated at night, with the female sleeping elsewhere. The pair alternated in these duties during the day. The newly hatched young were completely naked. Only 1 young bird was brought to maturity in this nest.

Belcher and Smooker (Ibis, 1936, p. 797) list measurements of 4 eggs of the slightly smaller race *Piculus rubiginosus trinitatis* from Trinidad as 24.5-26.0×18.7-19.3 mm. Two other eggs collected by Belcher at Macquarie, Trinidad, now in the British Museum (Natural History) that I have examined, are slightly smaller, with

the size 22.2×17.4 and 23.2×17.5 mm. They are subelliptical in form, white and smooth, with high gloss.

In my experience I have found these birds ranging on open tree trunks. A female taken on Cerro Pando, March 24, 1954, was nearly ready to lay. Food may include fruits as a male had eaten one of the abundant large blackberries.

The species *Piculus rubiginosus*, with an extensive range from southern Veracruz through Central America and northern South America, in the western mountains to Bolivia and Argentina and in the east through Venezuela, Trinidad, Tobago, and Guyana, has been divided among many races. The subspecies of western Panamá is found also through Costa Rica. In the specimens examined those from Panamá have averaged slightly brighter yellowish green in the lighter barrings and darker in the others.

**PICULUS SIMPLEX SIMPLEX (Salvin): Rufous-winged
Woodpecker, Carpintero Alipardo**

Chloronerpes simplex Salvin, Proc. Zool. Soc. London, November 1870, p. 212.
(Bugaba, Chiriquí, Panamá.)

Chloronerpes simplex aurorae Griscom, Amer. Mus. Nov., no. 293, January 12, 1928, p. 3. (Almirante, Bocas del Toro, Panamá.)

Rather small; like *Piculus collopterus* but side of head brown; chin and throat plain, without markings.

Description.—Length 170-185 mm. Adult male, crown, nape, hindneck, and malar stripe bright red; upper surface yellowish olive-green; outer webs of primaries and secondaries brownish black, barred with cinnamon-rufous; upper tail coverts tipped or edged with dull yellow; tail feathers dull olive-green laterally, with shafts and central area dull black; side of head dull olive-green; chin and throat olive, unmarked; foreneck and upper breast dull greenish olive, spotted sparingly with pale buff to buffy yellow; rest of under surface, including sides and undertail coverts, buffy yellow barred with dark olive; under wing coverts cinnamon-rufous.

Adult female, like male but only the nape and hindneck red; crown and malar region dull yellowish olive.

The label on American Museum of Natural History no. 487373, ♀, collected by H. J. Watson at Bugaba, Chiriquí, November 7, 1903, notes the iris as white, bill lead color, and feet greenish black. On specimen 389999, from Volcán Turrialba, Costa Rica, taken April 4, 1925, A. P. Smith noted the eye as bluish white, bill pale blue, and tarsi olive.

Measurements.—Males (11 from Costa Rica and Panamá), wing 105.5-114.2 (109.6), tail 57.0-62.0 (59.6), culmen from base 20.0-23.7 (21.9), tarsus 17.0-19.3 (18.0) mm.

Females (6 from Costa Rica and Panamá), wing 104.0-114.0 (109.9), tail 54.8-61.2 (59.1, average of 5), culmen from base 21.1-22.7 (21.7), tarsus 17.9-19.4 (18.6) mm.

Resident. Rare in the lowlands of western Chiriquí, western Bocas del Toro, and the Caribbean slope of Veraguas, near the Río Calovévora.

Arcé collected the type specimen, a female, at Bugaba in 1869, and later secured another of the same sex, marked only as from Chiriquí. These are the only records from the Pacific slope. Hargitt (Cat. Birds Brit. Mus., vol. 18, 1890, p. 81) through an evident error listed this second specimen as the type. The species was recorded next in the Republic in Bocas del Toro, when on February 11, 1926, F. H. Kennard collected a male on Western River near Almirante (Kennard and Peters, Proc. Boston Soc. Nat. Hist., vol. 38, 1928, p. 454). Later in the same year R. R. Benson and Lieutenant Dale V. Gaffney found the species near the Río Calovévora on the Caribbean slope of northern Veraguas (Griscom, Amer. Mus. Nov., no. 280, 1927, p. 2). Benson subsequently collected others near Almirante, Bocas del Toro. Griscom described a subspecies from these under the name *aurorae*, which later proved invalid.

Beyond Panamá this species is found through Costa Rica to Nicaragua. Slud (Amer. Mus. Nat. Hist., Bull. 128, 1964, p. 188) describes the call as resembling that of the golden-olive woodpecker but "more drawn out and descends with weakening intensity as it finishes." While he notes the iris as "sky-blue," Kennard (*cit. supra*) recorded in a male that the eye was white.

PICULUS LEUCOLAEMUS CALLOPTERUS (Lawrence):
Stripe-cheeked Woodpecker, Carpintero de Mejilla Rayada

Chloronerpes callopterus Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1862, p. 476. (Atlantic side, line of the Panama Railroad = Caribbean slope, Canal Zone, Panamá.)

Similar to the rufous-winged woodpecker, but throat barred, and a white streak on the side of the head.

Description.—Length 165-180 mm. Adult male, feathers of crown and hindneck tipped with red, with the gray bases visible irregularly; back, scapulars, outer webs of secondaries and lesser to greater wing coverts orange-brown; distal ends of primaries and secondaries

dusky brown; rest of these feathers cinnamon-rufous barred irregularly with black; rump and upper tail coverts light olive, with shaft lines, and, in some, with crossbars of buffy yellow; tail dull black, edged with greenish olive, the two outermost rectrices with a shaft line of cinnamon-rufous; upper auricular region olive; a broad stripe of yellowish white on side of head from nostril back below the eye and over the lower auricular area; malar stripe red; throat dull white; spotted irregularly with dusky slate; lower foreneck and upper breast olive, with irregular spots of dull buffy yellow; rest of under surface, including sides and under tail coverts, dull yellowish white, barred with dusky olive; edge of wing yellow, lightly barred and spotted with olive; under wing coverts cinnamon-buff; bases of primaries and secondaries cinnamon-rufous.

Adult female, like male, but with crown dark gray, and malar region grayish olive.

Measurements.—Males (7 from Colón and Darién), wing 105.4-110.3 (107.3), tail 56.0-59.2 (57.3), culmen from base 20.7-22.0 (21.3), tarsus 18.0-19.3 (18.5) mm.

Females (7 from Canal Zone, eastern Province of Panamá, and Darién), wing 102.6-110.0 (106.4), tail 53.6-58.7 (56.5), culmen from base 20.3-22.6 (21.4), tarsus 18.5-19.8 (18.9) mm.

Resident. Rather rare and little known; recorded from Veraguas, the Caribbean slope of the Canal Zone, Cerro Bruja, Colón, Cerro Azul and Cerro Chucantí, eastern Province of Panamá, Cerro Sapo, Cerro Pirre, and the upper Río Jaqué, Darién.

The type specimen (listed as a male, but from the plumage a female) was collected by McLeannan and Galbraith on the Atlantic slope near the railroad.

Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, p. 409, pl. 59, fig. 1) describe and figure another female "sent us by Arcé in one of his last collections made in Veraguas." This specimen, now in the British Museum is marked as taken in 1875. Hargitt (Cat. Birds Brit. Mus., vol. 18, 1890, p. 81) gives the locality as "Veragua" which is misleading as this would imply that the bird might have come from Chiriquí. Griscom (Amer. Mus. Nov., no. 293, 1928, p. 4) probably is correct in his statement that the bird "must almost certainly have come from the Caribbean slope." The first male from Panamá was secured by E. A. Goldman on Cerro Bruja on June 4, 1911. Goldman's notes record that it was "on the trunk of a tree loaded with aerial plants." Goldman, the following year collected 2 males and a female near Cana, Darién. The bird was recorded next by Bond and

DeSchauensee (Acad. Nat. Sci. Philadelphia, Monogr. 6, 1944, p. 32) from 1 taken on Cerro Sapo, Darién, by the fifth George Vanderbilt Expedition of 1941. Eugene Eisenmann informs me that he has seen it on Cerro Azul.

In my own travels, I found this woodpecker first on the upper Río Jaqué, Darién, where we secured 2 males in tall trees over an Indian *Plátano* plantation on April 13, 1947. Later I shot a female on March 13, 1950, in the tall forest of the summit of the ridge of Cerro Chucantí in the eastern Province of Panamá. In late January and early February 1961, I found the bird fairly common in the heavy forest on the slopes of Cerro Pirre, and secured 2 more females. In habits these birds reminded me much of our northern downy woodpecker (*Dendrocopos pubescens*) as they worked quietly over the trunks of the trees in dense forest, pecking steadily at the wood. The stomachs of 2 of those taken by Goldman at Cana were filled with fragments of small ants.

As a whole the forms grouped by Peters (Check-list Birds World, pt. 6, 1948, p. 114) under the species name *Piculus leucolaemus* are little known. The range extends from eastern Bolivia and western Brazil north in eastern Perú and Ecuador, through Colombia to west central Panamá. In South America all are marked by a bright yellow to orange-yellow band across the side of the head, from the base of the lores to the side of the upper neck. In the population of Panamá this stripe is dull yellowish white and is much less conspicuous. Also the chin and throat are duller colored and size is small.

PICULUS CHRYSOCHLORUS AUROSUS (Nelson): Golden-green Woodpecker, Carpintero Dorado

Chloronerpes chrysochlorus aurosus Nelson, Smithsonian Misc. Coll., vol. 60, no. 3, September 24 (Sept. 27), 1912, p. 3. (Marragantí, Darién, Panamá.)

Of medium size, plain green above, golden below, barred with blackish slate; male entire crown red, in female golden yellow.

Description.—Length 210-225 mm. Adult male, crown and nape bright red; rest of upper surface bright olive-green; tail like back, but with heavy shaft lines of dull black; side of head through eye and loreal area bright olive-brown; a broad malar streak red; line from the base of the nares back along side of head golden yellow; chin and throat golden buff; rest of lower surface from lower foreneck to under tail coverts golden yellow, barred somewhat narrowly with blackish slate; edge of wing light yellow, with a few small spots and bars of blackish slate; under wing coverts light cinnamon-buff; most

of under surface of primaries and secondaries cinnamon-buff; under surface of tail dull golden green.

Adult female, in general like male, but with crown, nape, and malar area golden yellow (in some with scattered tinges of red).

Immature, duller green above; duller, more buffy below.

Measurements.—Males (6 from Darién and northern Colombia) wing 122.1-126.4 (123.7), tail 62.8-68.0 (66.5, average of 5), culmen from base 23.8-27.1 (25.4, average of 5), tarsus 20.0-21.0 (20.4) mm.

Females, (6 from northern Colombia), wing 120.5-126.0 (122.5), tail 60.0-62.9 (61.5), culmen from base 23.7-24.7 (24.2, average of 5), tarsus 20.2-21.0 (20.4) mm.

Resident. Known in Panamá from 2 specimens from the Tuira-Chucunaque Valley, Darién.

The type specimen, an adult male, was collected by E. A. Goldman on April 4, 1912, at Marragantí, a locality at the head of tidewater on the Río Tuira, a short distance down river from Boca de Cupe. On April 3, 1959, I secured another male as it moved over open branches at low level in unbroken forest at Quebrada Cuatro on the Río Chucunaque near the mouth of the Río Tuquesa.

In his work for the Smithsonian in northern Colombia, M. A. Carriker, Jr., secured several that I have assigned to this race in the area between the Department of Córdoba (from the lower Río Sinú to Pueblo Nuevo), Cartagena, Bolívar, and northeastern Magdalena. One was collected near El Conejo in western Guajira.

The race *xanthochloros* of northeastern Colombia and adjacent Venezuela is duller in color.

**CELEUS CASTANEUS (Wagler): Chestnut-colored Woodpecker,
Carpintero Castaño**

Picus castaneus Wagler, Isis von Oken, vol. 22, 1829, col. 515. (Valle Real, México.)

Medium size; crested, head decidedly paler brown than the chestnut-brown body; barred with black.

Description.—Length 230-250 mm. Crest long, pointed; tail and outer primaries without bars. Adult male, anterior area of side of head from behind the eye to the upper side of the throat forward to the loreal area and the side of the jaw bright red; crown, crest, and hindneck clay color to tawny; back, wings, and upper tail coverts rufous-chestnut barred with black except on the wings; rump cinnamon to cinnamon-buff; tips of wings dull grayish brown; tail chestnut at base, dull black distally; foreneck clay color to tawny,

the chin and upper throat in some red or mixed with red; rest of under surface chestnut, marked heavily with V- or U-shaped bars of black; under wing coverts and axillars yellow to buff; inner webs of wing feathers cinnamon-rufous.

Adult female, with no red on head; otherwise like the male.

Kennard (in Kennard and Peters, Proc. Boston Soc. Nat. Hist., vol. 38, 1928, p. 454) in a male taken at Almirante, March 2, 1926, recorded colors as follows; "iris garnet brown, base of bill sky blue, tip sulphur yellow, sides picric yellow, culmen plain green yellow, periophthalmic space dark gray-blue."

Measurements.—Males (12 from México, Honduras, Petén, Nicaragua, Costa Rica, and Bocas del Toro), wing 122.0-130.0 (126.6), tail 77.6-87.0 (81.4), culmen from base 25.5-28.4 (26.5), tarsus 23.4-26.6 (24.5) mm.

Females (11 from México, Honduras, Nicaragua, Costa Rica, and Bocas del Toro), wing 123.2-129.6 (125.4), tail 74.8-85.2 (78.9), culmen from base 25.5-29.0 (26.9), tarsus 23.0-24.9 (24.0) mm.

Resident. Fairly common in western Bocas del Toro from the eastern shores of the Laguna de Chiriquí to the Costa Rican boundary; recorded inland to 360 meters on the trail to Boquete.

This is a species of the dense rain forest where it may easily escape detection because of its dark colors in the dim light filtered through the leaf canopy in which it lives. In 1958, when I saw them around the shores of Bahía Almirante, I located them usually by their persistent pecking as they worked over the trees. I found them at times in the mangrove swamps, but more often inland. Frequently they ranged high above the ground. The call was a low *kwar*, in sound like a similar note of Wagler's woodpecker.

In preparing specimens I noted the large size of the functional tufted oil gland in which the ovoid lobes each measured 12 millimeters long by 7 wide at the broadest point. The salivary glands also were large, extending the full length of the mandibular rami. As I skinned the heads the mucous secretion adhered like a gum to my fingers.

When these woodpeckers come into cacao plantations there is some complaint of their damage to the fruit.

The species, here at its southern limit, ranges north to Veracruz in México. In the original description Wagler listed no type locality. Cory (Field Mus. Nat. Hist., Zool. Ser., vol. 13, 1919, p. 453) suggested "Vera Cruz, Mexico as an appropriate type locality." Later, however, van Rossem (Bull. Mus. Comp. Zool., vol. 77, 1934, p. 412), who examined the male and female of Wagler's original material in

the Zoological Museum in Berlin, found that these are labeled as collected by Deppe at Valle Real, México, which must be accepted as the type locality.

**CELEUS LORICATUS (Reichenbach): Cinnamon Woodpecker,
Carpintero Acanelado**

FIGURE 70

Mciglyptes loricatus Reichenbach, Handb. Spec. Orn., cont. xii, Scansoriae c Picinae, 1854, p. 405, pl. DCLXXXI, figs. 4495, 4496. (Perú.)

Rather small; with a short, bushy crest; crown and crest rufous like the back.



FIGURE 70.—Cinnamon woodpecker, carpintero acanelado, *Celeus loricatus*.

Description.—Length 185-210 mm. Tail and outer primaries heavily barred with black. Adult male, above rufous, rump and upper tail coverts paler, in some nearly plain, in others spotted and barred more or less with black; tail and primaries barred and tipped broadly with black; secondaries barred with black, but with the tips rufous; malar region, chin, and upper throat red, the chin and throat in some

plain, in others spotted and barred with black; lower foreneck and breast rather pale cinnamon-rufous; abdomen and under tail coverts paler, with heavy curved or angular marks of black, except that the abdomen in some is almost without markings; under wing coverts and under surface of wing cinnamon-rufous.

Adult female, similar but without red on throat or side of head.

These are forest woodpeckers, widely distributed but not common. Two races are found in the Republic.

CELEUS LORICATUS DIVERSUS Ridgway

Celeus loricatus diversus Ridgway, U. S. Nat. Mus., Bull. 50, pt. 6, April 8, 1914, pp. 140 (in key), 145. (Sipurio, Talamanca, Costa Rica.)

Characters.—Darker rufous on the head and dorsal surface; breast and abdomen also darker.

Kennard (in Kennard and Peters, Proc. Boston Soc. Nat. Hist., vol. 38, 1928, p. 445) recorded the iris as oxblood red; bill ivy green; tarsus pale grayish blue.

Measurements.—Males (9 from Costa Rica and Bocas del Toro), wing 121.0-126.8 (124.0), tail 62.5-70.5 (66.5), culmen from base 24.2-26.8 (25.4, average of 7), tarsus 20.0-22.7 (21.3) mm.

Females (10 from Costa Rica and Bocas del Toro), wing 119.2-126.8 (121.8), tail 59.7-68.2 (64.5, average of 9), culmen from base 22.7-26.8 (24.3, average of 9), tarsus 19.5-21.9 (20.5) mm.

Resident. Rather rare; known in Panamá from a few records in western Bocas del Toro.

This race was first recorded in Panamá by Kennard (*cit. supra*) who collected a male at Guabo, near the Río Guabo on the lower end of the old Boquete trail back of Chiriquí Grande on March 10, 1926. Benson secured 2 at Almirante May 20 and June 28 the following year. Near Almirante, Wedel collected a female on the Quebrada Nigua on November 1, 1927. On January 31, 1958, I took a male in high forest above Water Valley. We have another male collected by R. Hinds of the Gorgas Memorial Laboratory near Almirante, March 18, 1960. The race ranges through the dense humid forests of eastern Costa Rica, mainly in the lowlands, but is found also along the northern slope of the Cordillera Central to about 450 meters elevation at Carrillo. Carriker, in September 1904, collected 2 on the Costa Rican side of the international boundary, near the Río Sixaola below Cuabre. It is interesting that in Bocas del Toro and Costa Rica this species is found in the same forests as the somewhat larger *Celeus castaneus*.

In the original description of *diversus* Ridgway, through some oversight, did not list the type specimen. This, however, is clearly indicated in his manuscript records as U. S. Nat. Mus. no. 64872, ♂, collected at Sipurio, Costa Rica, March 31, 1873, by José C. Zeledón. In his sheet of measurements for this race Ridgway entered "Type" before this number, and also made this notation in the Museum catalog (by his own hand). Cory (Cat. Birds Amer., pt. 2, no. 2, 1919, p. 453) gives the type locality as "Talamanca" with a footnote in explanation which reads "Prof. Ridgway informs me that the type specimen was collected by Zeledón at Talamanca, Costa Rica." Sipurio, as cited above, is in the Talamanca district of the Province of Limón. Deignan (U. S. Nat. Mus. Bull. 221, 1961, pp. 211-212) has listed the 4 specimens cited by Ridgway in the original description as "co-types," as apparently he was not aware of Ridgway's notations listed above.

CELEUS LORICATUS MENTALIS Cassin

Celeus mentalis Cassin, Proc. Acad. Nat. Sci. Philadelphia, vol. 12, 1860, p. 137. (Turbo, Antioquia, Colombia.)

Celeus squamatus Lawrence, Ibis, vol. 5, April 1863, p. 184. (Lion Hill, Canal Zone, Panamá.)

Characters.—Paler in color, more cinnamon-rufous; less heavily marked with black on lower surface, in some with the abdomen nearly immaculate.

A male, taken near the Candelaria Hydrographic Station on the Río Pequení, March 7, 1961, had the iris dull brownish red; base of maxilla below the nostril, and all of mandible dull greenish yellow, with the posterior section of the cutting edge of the maxilla and the base of the mandible tinged with neutral gray; rest of maxilla dull fuscous-brown, becoming darker at tip; tarsus neutral gray; toes brownish neutral gray; claws dusky neutral gray. Another male, collected at Pucro, Darién, February 4, 1964, had the iris reddish brown; base of maxilla below nostril and mandible, except extreme tip, light grayish green; rest of maxilla and tip of mandible fuscous; tarsus dull neutral gray; toes and claws fuscous, with the scutes outlined in grayish white.

Measurements.—Males (16 from Canal Zone, eastern Province of Panamá, Darién, and San Blas) wing 114.5-120.5 (117.2); tail 62.0-69.4 (65.4), culmen from base 22.0-25.6 (24.0), tarsus 19.4-22.5 (20.9) mm.

Females (15 from Canal Zone, eastern Province of Panamá, Darién, and San Blas), wing 114.0-121.7 (118.1), tail 60.6-68.8

(64.8), culmen from base 21.1-24.1 (22.9), tarsus 19.3-23.7 (20.9) mm.

Resident. Locally fairly common. On the Pacific slope through the eastern sector of the Province of Panamá (Chepo, Cerro Chucantí) and Darién (Tuira Valley, Jaqué); on the Caribbean side from northern Veraguas (probably), the lower Chagres Valley (Río Pequení, Barro Colorado Island) through San Blas (Bahía Caledonia, Permé, Puerto Obaldía).

The report for Veraguas, a male in the British Museum marked as taken by Arcé in 1875, probably was collected on the Caribbean slope as there are no records on the Pacific side west of San Antonio on the lower Río Bayano beyond Chepo. The bird has been found occasionally on Barro Colorado Island and elsewhere in the lower valley of the Río Chagres to the lower Río Pequení above Madden Lake. It is most common in Darién through the Tuira-Chucunaque Valley.

This is a forest species, but unlike the other race, found in Bocas del Toro, comes out in open areas in gallery forest, and in the forest growth bordering the rivers. I have found it occasionally in solitary guarumos (*Cecropia*) and other trees standing in clearings. Occasionally it mingles with the little bands of forest birds that move about in loose company. In the Jaqué area countrymen said that they came out in the plantations to feed at ripening bananas. The birds move about quietly, occasionally uttering low chattering calls.

The drumming of the males suggests that of *Centurus pucherani*, but is slightly slower and not quite as long. A female taken near the Candelaria Hydrographic Station on the lower Pequení on March 8, 1961, was laying.

The salivary glands extend for about three-fourths the internal length of the lower jaw, the abundant secretion being strongly adhesive.

The race *mentalis* ranges beyond Panamá across northern Colombia to the lower valley of the Río Magdalena.

[CELEUS IMMACULATUS Berlepsch

Celeus immaculatus Berlepsch, Ibis, ser. 4, vol. 4, January 1880, p. 113. (From an unknown locality.)

This supposed species, known only from the type specimen, without locality, has been listed as from Panamá, but without definite basis. The description is as follows: "This form, of which I have only a female in my collection, is most nearly allied to *C. elegans*, from which

it seems only to differ in having the inner webs of the wing-feathers plain yellow, without the black bands or spots to be seen in that species. If I do not err, my specimen has the preparation of Panama skins (Agua dulce), from which locality, as yet, neither *C. elegans* nor *C. castaneus* of Central America, has been recorded. Therefore it is quite likely that a somewhat intermediate form should be found in that locality, as my specimen seems to show."

No one seems to have examined the specimen critically since it was described. Hargitt (Cat. Birds Brit. Mus., vol. 18, 1890, p. 426) and Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, p. 443) merely quoted from the original description. Ridgway (U. S. Nat. Mus. Bull. 50, pt. 6, 1914, p. 141) pointed out the resemblance to *Celeus elegans* from the description, and questioned the locality. Peters (Check-list Birds World, vol. 6, 1948, p. 124) made similar comment. The specimen, evidently a trade skin, probably came from South America. The record has no proven place in the list of the birds of Panamá.]

DRYOCOPUS LINEATUS (Linnaeus): Lineated Woodpecker,
Carpintero Real Barbirrayado

FIGURE 71

Picus lineatus Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 174. (Cayenne.)

Large; a narrow white line from the nostril back along the side of the head; throat black streaked with white; space around eye and side of head dark slate; bill black.

Description.—Length 300-340 mm. Outer hind toe and outer front toe equal in length; gonyes about equal in length to unfeathered part of mandibular rami; nostril only partly covered by bristlelike feathers. Adult male, crown, nape, and prominent pointed crest bright red; center of hindneck and rest of upper surface including the tail black; a broad white stripe down the scapulars on either side; side of head, including space around eye and auricular region, slate-gray; a narrow line of dull orange-buff extends from the nostril back across the loreal region, changes to white, broadens at the neck, and then continues down the side of the neck to terminate midway of the side of the breast; malar stripe dark red; chin and throat streaked white and black, some individuals appearing very black, others mainly white; lower foreneck and upper breast black to sooty black; lower breast, sides, abdomen, and under tail coverts brownish buff to rather dull white, barred irregularly and spotted with sooty black; under wing



FIGURE 71.—Lineated woodpecker, carpintero real barbirrayado, *Dryocopus lineatus*.

coverts, edge of wing, and bases of secondaries and primaries white or buff.

Adult female, in general like male, but with anterior half of crown and malar area black.

Immatures, similar in color pattern to adults but coloration duller.

As a species this large woodpecker has a broad range from México

through Central America and South America to northern Argentina, Paraguay, and southern Brazil. Two of its geographic races are found in Panamá.

DRYOCOPUS LINEATUS MESORHYNCHUS (Cabanis and Heine)

Ceophloeus mesorhynchus Cabanis and Heine, Mus. Hein., pt. 4, 1863, Heft. 2, p. 86, (Río Sarapiquí, Costa Rica.)

Characters.—Under wing coverts distinctly buff; the throat blacker, with the white reduced in extent.

Measurements.—Males (10 from Panamá and Costa Rica), wing 179-189 (184.5), tail 110.4-122.5 (115.0), culmen from base 36.8-43.2 (39.8), tarsus 28.4-31.2 (29.8) mm.

Females (9 from Panamá and Costa Rica), wing 177-189 (181.5), tail 105.1-123.1 (117.4), culmen from base 35.0-41.7 (37.5), tarsus 28.2-31.6 (29.5) mm.

Resident. Uncommon, in western Bocas del Toro.

The name *mesorhynchus* covers a transition population, mainly of the Caribbean slope of Costa Rica, between *Dryocopus lineatus similis* of northern Central America, which has a lighter colored bill and smaller size, and the following race *nuperus*, in which the bill is wholly dark, the size larger, and the under wing coverts very pale yellow. In size, *mesorhynchus* is equal to *nuperus*. Those that I have seen from Bocas del Toro have the bill dark like *similis*, but in occasional individuals from Costa Rica it is paler in color.

This race was recorded first in the Republic by Kennard (Kennard and Peters, Proc. Boston Soc. Nat. Hist., vol. 38, 1928, p. 455), who in 1926 collected 2 females at Almirante on February 17 and 26, and a male at Chiriquicito on March 28. Hasso von Wedel secured others at Changuinola on September 29, and at Fruitdale on May 7, 1928 (reported by Peters, Bull. Mus. Comp. Zool., vol. 71, 1931, p. 319), and 1 on Western River on July 12, 1928, now in the British Museum in London. Loye Miller in 1936 collected 2 on March 26 and April 2, (in the collections of the University of California at Los Angeles). In my work in 1958, I secured a female on Quebrada Pastores on February 14. One in the Gorgas Memorial Laboratory was taken near Almirante, January 23, 1961.

From available information this race in Panamá is found only in the area from the eastern border of the Laguna de Chiriquí to the Costa Rican boundary at the Río Sixaola.

DRYOCOPUS LINEATUS NUPERUS (Peters)

Ceophloeus lineatus nuperus Peters, Occ. Pap. Boston Soc. Nat. Hist., vol. 5, September 2, 1930, p. 320. (La Concepción, 900 meters, Sierra Nevada de Santa Marta, Magdalena, Colombia.)

Characters.—Under wing coverts pale yellow to white; throat averaging paler, with more white.

A male, taken at Armila, San Blas, February 25, 1963, had the iris yellowish white; bill black; tarsus and toes greenish neutral gray; claws black.

A female, collected at Pucro, Darién, February 2, 1964, had the iris ivory-white; tips of maxilla and mandible, and basal two-thirds of mandible brownish neutral gray; rest of bill black; tarsus and toes dull brownish neutral gray; claws black. Another female, secured at Puerto Armuelles, Chiriquí, February 8, 1966, had the iris light orange-yellow, and the bill dull black.

Measurements.—Males (13 from Panamá), wing 175.0-186.0 (180.3), tail 105.0-117.1 (111.5), culmen from base 37.7-41.8 (39.5), tarsus 29.4-31.9 (30.5) mm.

Females (16 from Panamá), wing 173-187 (177.8), tail 105.8-114.7 (108.9), culmen from base 33.9-39.0 (36.9), tarsus 28.8-31.3 (30.1) mm.

Resident. Common, widely distributed in wooded areas in the lowlands; on the Pacific slope from western Chiriquí to eastern Darién; on the Caribbean side from eastern Veraguas through San Blas.

Although this is a forest bird, it ranges widely in feeding in the tall hardwoods left standing in many clearings, and also in the large trees that line the courses of streams in savanna country, as well as in swampy woods in the lowlands near the coast. They are thus conspicuous members of the family because of their size, and their regular appearance in isolated trees. The fast-growing second growth that covers abandoned fields is suitable for their needs also, as soon as the guarumos (*Cecropia*) are of fair size. Through this adaptability this woodpecker may remain in areas where other forest birds have disappeared.

They are spirited and active in movement, often calling attention by rattling calls, as well as by their drumming on dead branches. The drum sometimes is divided: first several quick strokes followed instantly by a series more rapid that produce a blur of sound. Naturalists who know the related pileated woodpecker (*Dryocopus pileatus*) of North America will find the drum similar but often less far-reaching and sonorous.

One of the three stomachs that I examined in detail held remains of many ants of three distinct species. The second had skins of several caterpillars, bits of ants, an orthopteran egg case, a number of beetles of several kinds, and a few seeds. The other had the thin-walled stomach packed with a dozen seeds of a *Heliconia*, each in shape like a kernel of corn.

The salivary glands in this species are large, extending the full length of the lower jaw, with the sticky secretion abundant. The tongue tip is longer and more flexible than that of species of *Campephilus* of similar size.

Belcher and Smooker (Ibis, 1936, p. 798) describe the eggs of the somewhat larger typical race, *Dryocopus lineatus lineatus*, on Trinidad as "pointed ovals, with the shell pure white, close-grained and highly glossy." One set of 3 eggs measured on average $33.5\text{--}34.3 \times 25\text{--}25.8$ mm. Another set of 2 were $34.5\text{--}34.8 \times 26.0$ mm.

This race beyond Panamá has a broad range across northern Colombia to northwestern Venezuela. It is probable that in western Chiriquí it continues into adjacent southeastern Costa Rica, as on the Burica Peninsula, divided between the two Republics by a low, central ridge of hills, I collected specimens of *nuperus* on the head of the Río Corotú part way up the hillside on the Panamanian side of the boundary.

MELANERPES FORMICIVORUS STRIATIPLECTUS Ridgway:
Acorn Woodpecker, Carpintero Tigre

FIGURE 72

Melanerpes formicivorus striatiplectus Ridgway, in Baird, Brewer, and Ridgway, Hist. N. Amer. Birds, vol. 2, January 1874, p. 561. (Birris, Costa Rica.)

Medium size; mainly black above, with white forehead and red nape; throat black, foreneck pale yellow; breast streaked black and white.

Description.—Length 190-215 mm. Prefrontal feathers bristle-like, rather long and dense, projected forward, usually concealing the nostrils; feathers of breast long, broad, and widely overlapping. Adult male, anterior area of crown white; rest of crown and nape bright red; side of head, including space around eyes (continuous with the black of the center of the crown), hindneck, back, scapulars, and wing coverts black with a bluish sheen; wings black, with a partly or wholly concealed white patch across the center of the inner primaries; the inner webs of the secondaries broadly spotted with white; rump and upper tail coverts white; tail black; bristly feathers over nostrils,

anterior lores, and feathered anterior side of mandible, chin, and throat black; a white line, continuous with the white of the forehead, extending down across the loreal area to cover the posterior side of the jaw; foreneck light yellow; narrow band across junction of lower foreneck and upper breast black, occasionally with a wash of red in the center; rest of under surface white with upper breast, sides, and



FIGURE 72.—Acorn woodpecker, carpintero tigre, *Melanerpes formicivorus striatipectus*.

under tail coverts streaked narrowly with black; edge of wing white; under wing coverts black, lined lightly with white.

Adult female, like male, but with the center of the crown black, continuous with that color on the side of the head. One specimen seen had the outer pair of rectrices tipped lightly with white; others had these feathers plain black.

Immature, with black markings of lower surface duller; red of crown duller and restricted, so that it is mixed with the partly exposed dark slate of the feather bases.

A female, taken at El Volcán, February 28, 1965, had the iris yellowish white; thickened edge of eyelid dull black; rest of bare skin around eye dull fuscous; tarsus and toes dull greenish neutral gray; claws dull black.

Measurements.—Males (12 from Chiriquí), wing 133.4-145.4 (138.8), tail 67.8-80.0 (74.8), culmen from base 25.6-29.1 (27.3), tarsus 22.1-23.6 (22.8) mm.

Females (12 from Chiriquí), wing 132.6-139.9 (135.8), tail 70.0-80.0 (73.5), culmen from base 23.9-29.9 (26.9), tarsus 22.0-23.7 (22.7) mm.

Resident. Locally common in the Subtropical and lower Temperate Zones between 1,250 and 2,280 meters in the mountains of Chiriquí and Veraguas.

These birds were reported first in Panamá by Sclater (Proc. Zool. Soc. London, 1856, p. 143) from collections made by Bridges, who found them "not rare in the forests of the Boqueti." As the title of Sclater's paper reads "List of Mammals and Birds collected by Mr. Bridges in the vicinity of the town of David," etc., early accounts quoted this first record of this mountain bird erroneously as from the lowlands near David. Other recently published lowland records (Auk, 1950, p. 364) from Isla Burica and Isla Sevilla, Chiriquí, were taken from specimens forwarded by J. H. Batty with falsified locality data.

Primarily, these woodpeckers are forest birds that range over open branches, projecting stubs, and dead limbs rising above the main high tree crown. As land has been cleared for agriculture they have found the tall trees, dead and living, left standing in pasturelands and cultivated fields attractive. It is there that they come most often under observation, as elsewhere usually they are concealed from view by leaves. They are gregarious, and are found in pairs and in little groups. In the early morning chill of the mountain air they rest in the sun or fly about sociably several together, regularly coming to attention through their loquacious calls of *ya-cob ya-cob* and other chattering notes. In March on the mountain slopes above El Volcán and Cerro Punta I found them active about holes cut in high limbs, and apparently they were ready to nest.

Skutch (Scient. Month., 1943, pp. 363-364) in Costa Rica found that at night like other woodpeckers they slept in the holes that they had made in dead branches and stubs. They differed from the usual custom of other species, however, in that instead of roosting in pairs or alone, several, up to 5, joined in company in the same cavity. He found also that their nesting was a communal affair, as has been

recorded in the race of this bird in California. In one instance 4 males and 1 female shared in incubation in a single nest. In this there was constant shifting among them, as in one 12-hour period of observation he noted 17 minutes as the longest period of duty for any one of the company. In another nest 2 males and 2 females brought food to the nestlings. The exact relationship among the adults was uncertain, as the nests were too high for close, detailed observation.

As a species this woodpecker ranges from southwestern Oregon, California, Arizona, and western Texas south through Central America to western Panamá, and is found again in the northern Andes in Colombia. Eggs of the races found south of northernmost México seem not to have been reported as yet. In view of the similarity of the subspecies *striatipectus* to the well-known forms of the United States it seems reasonable to assume that when finally described they will be similar. Bent (U.S. Nat. Mus. Bull. 174, 1939, p. 214) records the eggs of the race *M. f. bairdi* of Oregon and California as "short-ovate to elliptical-ovate. They are pure white, with very little or no gloss." He states further that in this northern race the bird "lays ordinarily four or five eggs; six eggs are not very rare; and as many as ten have been found in a nest, probably the product of two females." Average size, from the figures that he gives, is about 26.0×19.8 mm. It is probable that the number of eggs in the southern race may be fewer. Skutch (*loc. cit.*, p. 363) has noted that acorns are a prime source of food with these birds in Costa Rica as in the North, where they store large numbers of the nuts, regularly in holes cut in the bark of trees to receive them, one by one. He observes that "in Central America they appear never to carve these special holes, being content to tuck away whole or fragmented acorns in such chinks and crannies as they can find already at hand in the trees." The habit seems variable as Eisenmann (Auk, 1946, p. 250) in July 1945, near El Volcán "had no difficulty in finding a stub decorated with the characteristic acorn-filled borings, and I watched one bird in the process of inserting an acorn."

CENTURUS RUBRICAPILLUS Cabanis: Wagler's woodpecker,
Carpintero Habado

FIGURE 73

Centurus rubricapillus Cabanis, Journ. f. Orn., vol. 10, July 1862, p. 328.
(Barranquilla, Atlántico, Colombia.)

Medium size; wings and back evenly barred with black and white.

Description.—Length 160-185 mm. Adult male, forehead dull

white, changing on side of crown to light brownish gray tinged with yellow behind nostrils; rest of crown and nape bright red; back, wing coverts, and secondaries black, barred evenly with white; rump and upper tail coverts white; tail black, with central pair of rectrices barred and spotted broadly with white; two outer pairs tipped and barred narrowly with white; primaries black in part tipped and edged narrowly and barred across center with white; throat grayish white;



FIGURE 73.—Wagler's woodpecker, carpintero habado, *Centurus rubricapillus*.

side of head, lower foreneck, breast, and sides buffy gray; lower abdomen red, with a concealed bar of white on each feather; flanks and under tail coverts dull white barred with black; under wing coverts white barred with black; inner webs of wing feathers dull black barred with white.

Adult female, with anterior crown grayish white, except for the indefinite reddish spots at the base of the nostril; nape red; otherwise like male.

Juvenile male, with lower foreneck, breast and sides lined indistinctly with dull black; forehead duller gray, and crown duller red than in adult.

Juvenile female, crown feathers light gray with subterminal spots of dull black, producing a mottled appearance; nape paler, more orange-red, in some the bright color much restricted; streaking on under surface less in amount than in the juvenile male, in some absent; center of abdomen faintly tinged with orange-red.

As a species this woodpecker is found from southwestern Costa Rica and western Chiriquí along the Pacific slope of Panamá, (including offshore islands) to westernmost Darién. In the lowlands of the Canal Zone area it crosses to the Caribbean side, where it ranges west to the valley of the Río Indio in western Colón and northern Coclé, and east through eastern Colón to western San Blas. After a considerable gap that includes most of Darién and San Blas in Panamá, and Chocó and northwestern Antioquia in Colombia, it appears again in the valley of the Río Sinú, in Córdoba, and continues east across northern Colombia and northern Venezuela. Throughout the entire range the only outstanding differences are in the definitely darker population of Isla Coiba, and in those with reduced red on the head of the Guajira Peninsula and the coastal area of northwestern Venezuela. Aside from these there is some variation in size and, to a slight degree, in color mainly on the lower surface of the body.

In an earlier study of these birds (Smithsonian Misc. Coll., vol. 134, no. 9, 1957, pp. 51-54), with the information then available, I listed birds of the entire mainland range under the subspecies *rubricapillus*, except for the population called *paraguanae*. Field work since in eastern Panamá has outlined the extensive gap in the range which separates the birds of Panamá from those of South America. This, with additional series of specimens, has clarified detailed minor variations of difference, so that clearer understanding of the group is possible. With this the birds of mainland Panamá, and of Colombia and Venezuela, may be distinguished by slight differences as separate subspecies.

The following summary outlines present understanding of these races, except for the island subspecies of Panamá which are described later in this report.

Centurus rubricapillus terricolor Berlepsch

Centurus terricolor Berlepsch, Ibis, January 1880, p. 113. (Orinoco district, Venezuela.)

Similar to *C. r. rubricapillus*, but breast somewhat darker, more brownish gray; chin darker (less whitish); larger.

Males (13 from Venezuela), wing 104.0-113.2 (108.0), tail 49.0-56.7 (53.6), culmen from base 22.0-27.9 (25.1), tarsus 19.0-20.5 (19.9) mm.

Females (5 from Venezuela), wing 104.3-108.8 (106.0), tail 48.5-52.5 (50.3), culmen from base 21.0-24.1 (22.9), tarsus 19.1-20.0 (19.3) mm.

Venezuela, mainly north of the Río Orinoco (except the north-western coastal area); to the south only in northern Bolívar and northern Amazonas; Isla Margarita; Tobago.

These woodpeckers are not found on Trinidad, or in Delta Amacuro, Venezuela, on the mainland immediately to the south.

Centurus rubricapillus paraguanae Gilliard

Centurus sublegans paraguanae Gilliard, Amer. Mus. Nov., no. 1071, June 5, 1940, p. 7. (Cerro Santa Ana, Paraguaná Peninsula, Falcón, Venezuela.)

White bars on upper surface broader, so that the birds appear lighter colored; males with red of crown reduced to a central spot; females with nape pale dull brown to faintly orange.

Northern Lara and Falcón (including the Paraguaná Peninsula), Venezuela, and the eastern end of the Guajira Peninsula (Nazaret, Puerto Estrella), Colombia; intergrading with *Centurus r. rubricapillus* through western Guajira in the valley of the Río Ranchería.

Measurements.—Males (7 from the Guajira and Paraguaná Peninsulas), wing 106.5-111.4 (108.1), tail 54.0-59.6 (57.7, average of 6), culmen from base 25.6-28.7 (27.1), tarsus 19.8-21.0 (20.4, average of 6) mm.

Females (4 from the Guajira and Paraguaná peninsulas), wing 101.2-106.0 (103.8), tail 52.3-58.0 (54.5), culmen from base 22.4-25.3 (24.0), tarsus 19.5-20.1 (19.8) mm.

Centurus rubricapillus rubricapillus Cabanis

Centurus rubricapillus Cabanis, Journ. f. Orn., vol. 10, July 1862, p. 328. (Barraquilla, Atlántico, Colombia.)

Melanerpes sublegans neglectus Richmond, Proc. U. S. Nat. Mus., vol. 18, August 12, 1896, p. 667. (Bogotá, Colombia.)

Melanerpes wagleri sanctae-martae Bangs, Proc. Biol. Soc. Washington, vol. 12, June 3, 1898, p. 134. (Santa Marta, Magdalena, Colombia.)

Smaller than other races of South America; breast paler, chin and upper throat whiter.

Males (20 specimens), wing 101.2-106.9 (104.5), tail 43.0-51.5 (46.5), culmen from base 21.6-26.7 (24.2), tarsus 18.0-20.2 (19.1) mm.

Females (13 specimens), wing 95.9-102.7 (99.2), tail 42.7-48.2 (44.9), culmen from base 20.0-23.0 (21.3), tarsus 17.9-18.8 (18.2) mm.

Northern Colombia from valley of the Río Sinú (Tierra Alta), Córdoba eastward across northern Antioquia (El Pescado), southern Bolívar (La Raya, Simití, Santa Rosa) and northern Santander (Hacienda Santana) north to the Caribbean coast, east to northeastern Magdalena (Mamatoco).

Centurus rubricapillus wagleri (Salvin and Godman)

Larger; breast duller gray, darker, less brownish than in *rubricapillus*; white barring on outer rectrix extensive; nasal tufts and bristly feathers adjacent are paler, grayish white to buffy yellow.

For range, other details, and measurements, see the accounts that follow, which also include treatment of the two island subspecies of Panamá, *C. r. seductus* and *C. r. subfuscus*.

CENTURUS RUBRICAPILLUS WAGLERI (Salvin and Godman)

Melanerpes Wagleri Salvin and Godman, Biol. Centr.-Amer., Aves, vol. 2, January 1895, p. 416. (Loma del León, Canal Zone, Panamá.)

Characters.—Larger; breast duller gray (less brownish than that of *C. r. rubricapillus* of Colombia); white on outer rectrix extensive; nasal tufts and bristly feathers immediately adjacent paler (grayish to buffy yellow).

Iris in male reddish brown, in female pale dull reddish brown to light Verona brown; bill in some wholly dull black, in others black, but with the base of the mandible dark neutral gray; tarsus and toes dull greenish gray to light brownish gray; claws dusky neutral gray.

Measurements.—Males (27 from Panamá), wing 106.6-113.9 (111.3), tail 51.0-55.3 (53.0), culmen from base 22.9-27.2 (25.6), tarsus 18.7-20.7 (19.8) mm.

Females (33 from Panamá), wing 105.2-109.6 (107.2), tail 44.2-52.3 (49.6), culmen from base 21.3-25.1 (22.2), tarsus 18.1-20.0 (19.2) mm.

Resident. Common; on the Pacific slope from the boundary with Costa Rica east to the coastal region of western Darién (Punta La Sabana at the mouth of the Río Tuira); on the Caribbean side from

the valley of the Río Indio (El Uracillo, northern Coclé, and Chilar, western Colón) east through the valley of the lower Río Chagres from Madden Lake to the sea in the Canal Zone; and to Mandinga in the western San Blas; to 1,500 meters on the west, (less commonly to Cerro Punta at 1,800 meters) and to 1,600 meters on the east side of the volcano in Chiriquí.

In the eastern Province of Panamá in February 1962, I noted these birds near El Llano on the lower Río Bayano. Farther east, in 1950, it was common at Chimán and on the Río Majé from near the mouth to the Quebrada Cauchero at the base of Cerro Chucantí. The most eastern record is that of Festa (Salvadori and Festa, Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 14, 1899, p. 8) who collected 2 at Punta la Sabana, Darién, June 26, and in July, 1895. This locality is on the northern shore of the estuary in the mouth of the lower Río Tuira. The bird apparently is restricted to the coastal area here, as it has not been found farther inland in the Tuira-Chucunaque Valley.

On the Caribbean slope in 1952 these birds were common along the Río Indio from the mouth in western Colón inland to El Uracillo in northern Coclé. They are common in the northern area of the Canal Zone but do not appear to range in the Chagres Valley above Madden Lake. Near Mandinga in the western end of San Blas they were common in 1957. It is possible that they continue somewhat farther east along this coast, but they have not been found in the eastern San Blas.

Beyond Chiriquí, Wagler's woodpeckers continue in southwestern Costa Rica to the upper valley of the Río Térraba and its tributary the Río General, ranging upward to about 1,350 meters on the slopes of the Cordillera de Talamanca. As the most western point in the range of the Colombian race *C. r. rubricapillus* is near the coast in the lower Sinú Valley in the Department of Córdoba, there is a considerable gap in the distribution of the species.

Within the range outlined this is a common bird, widely known as it is found in trees standing scattered in pastures and other open lands, and comes also to shade trees around houses, even in the larger towns and cities. In the savannas it follows the lines of trees along streams, and near the sea ranges in mangroves. It also may be widely spread in gallery forest, even where this is tall, but here it is not seen easily as it lives among the higher, more open branches, of the leafy tree crown, where it is partial to dead stubs that project in the sunlight above. The birds are adaptable so that as forests are cleared they remain in the scattered trees usually left standing, and thrive in

second growth, when this grows to cover any wastelands. Below the La Jagua Hunting Club they ranged far out across open marshes along the long lines of fence posts that separated the pastures. Only in heavy stands of wet rain and cloud forests are they absent. It is probable that they may extend their present range as forests are felled and the land becomes more open.

Wagler's woodpeckers regularly are found in pairs that occupy territories, and do not gather in sociable groups like those common among the acorn woodpeckers. Usually they are not shy, as their rattling, chattering calls attract attention as they rest on open perches. During their bounding flights between trees the tail appears short in relation to the broad, rounded wings, and the white rump shows prominently.

The nesting period on the Pacific slope of Panamá seems to begin toward the end of March. Though the birds drum occasionally at any season, then they are heard constantly. The sound is rapid, though not as fast as that of the related species, the red-bellied woodpecker *Centurus carolinus*, of the southeastern United States. Also the sequence is somewhat shorter. Males in display follow the females in flight, and then when they alight raise the stiffly spread wings to hold them at a 45° angle while they call rapidly and repeatedly a high-pitched note, *whick whick whick*. Skutch (Scient. Monthl., 1943, pp. 360-361; Anim. Kingdom, vol. 59, 1956, p. 53) records that the male digs a hole in which he sleeps, and in which the female finally lays her eggs. Male and female alternate in incubation by day, but at night the female sleeps elsewhere, leaving the nest to the male. When the fledged young leave the nest they are not permitted to return at night. I have found grown young on the wing at the end of May and during June.

The field notes of Jewel (Stone, Proc. Acad. Nat. Sci. Philadelphia, vol. 70, 1918, p. 259) describe a nest found April 28, 1912, in a hole in a stub about 4½ meters from the ground. The 2 eggs measured 23.6×17.5 and 23.9×17.8 mm. All eggs in this family are glossy white. Jewel also recorded juvenile birds leaving the nest March 19, 1911, near Tabernilla, Canal Zone.

These birds are mainly insect feeders taking ants, beetles, small caterpillars, and other insects and spiders. They also eat drupes in berry-bearing trees on occasion.

CENTURUS RUBRICAPILLUS SUBFUSCULUS Wetmore

Centurus rubricapillus subfuscus Wetmore, Smithsonian Misc. Coll., vol. 134, no. 9, July 8, 1957, p. 50. (Isla Coiba, Panamá.)

Characters.—Very dark; decidedly brown on the lower surface, side of the head, and forehead; outer rectrices less heavily barred with white; white barring on upper surface narrower, so that the back and wings appear blacker; red of crown darker in male, and red of nuchal stripe darker in the female.

Measurements.—Males (12 from Isla Coiba), wing 101.8-108.5 (105.4), tail 48.7-55.9 (52.3), culmen from base 23.1-27.3 (25.2), tarsus 17.8-20.6 (19.0) mm.

Females (5 from Isla Coiba), wing 99.3-101.8 (100.4), tail 48.5-50.5 (49.4), culmen from base 22.0-23.4 (22.9), tarsus 17.5-18.2 (17.7) mm.

Resident. Common on Isla Coiba and Isla Ranchería. Found also on Isla Gobernadora and Isla Cébaco, at the entrance of Golfo de Montijo, but in intermediate stage toward *Centurus r. wagleri* of the mainland.

Among the woodpeckers of this group found in Panamá those of Isla Coiba stand out clearly in their much darker colors. It is interesting that a pair from Isla Gobernadora, and 2 males and 3 females from Isla Cébaco, are clearly intermediate in color and size between typical *subfuscus* and *Centurus r. wagleri* of the Panamanian mainland. They are clearly darker on the lower surface than *wagleri*, but agree in appearance with the mainland form in the extent of white on the back, and in the shade of red on the head. In coloration, at first glance, they suggest *seductus* of the Archipiélago de las Perlas, but on close examination they are browner though less so than the Coiba birds. Their size is intermediate, as shown by the average wing length of 108.7 mm. in the 3 males, and of 107.8 mm. in the 4 females. The two islands, near the mainland, are between 40 and 50 kilometers from Coiba.

These interesting woodpeckers are common on Isla Coiba, as *wagleri* is across the Pacific lowlands of the mainland. Daily during my stay in January and early February I recorded them in solitary trees left standing in clearings, and also in the heavy forest where they ranged in the open branches in the high tree crown, above the darker, shadowy depths below. Occasionally one came down above the undergrowth to chatter at me, or to look for some item of food. Near our quarters at the Colonia Central their calls and drumming came constantly to our ears. The darker color of this distinct race is seen instantly with a bird in the hand.

CENTURUS RUBRICAPILLUS SEDUCTUS (Bangs)

Malanerpes (sic) *seductus* Bangs, Auk, vol. 18, January 1901, p. 26. (Isla del Rey, Archipiélago de las Perlas, Panamá.)

Characters.—Breast darker, browner, chin and upper throat duller in color; smaller.

Measurements.—Males (13 from the Archipiélago de las Perlas), wing 99.8-106.6 (103.3), tail 47.4-51.0 (49.3, average of 6), culmen from base 25.2-28.1 (26.5), tarsus 18.6-21.7 (20.1) mm.

Females (13 from the Archipiélago de la Perlas), wing 97.7-104.0 (101.3), tail 46.2-52.8 (49.2, average of 7), culmen from base 21.8-24.7 (23.2), tarsus 17.4-20.0 (18.7) mm.

Resident. Fairly common in the Archipiélago de las Perlas, recorded from islas Bayoneta, Vivienda, Viveros, del Rey, Cañas and Santelmo. It is interesting to note that this bird was not found on Isla Pedro González in 1944, or on Isla San José in 1944 and 1946, both situated to the southwest of Isla del Rey.

These woodpeckers were fairly common in trees standing in clearings in areas that were farmed. In the uninhabited islands, they ranged in forest in the high tree crown. Those taken on Isla Santelmo were definitely smaller than others, but showed no other differences.

It has seemed strange that woodpeckers of this type were not seen on Isla Taboga and the smaller islands nearby.

CENTURUS PUCHERANI PUCHERANI (Malherbe):
Black-cheeked Woodpecker, Carpintero Mejillinegro

Zebrapicus Pucherani Malherbe, Rev. et Mag. Zool., ser. 2, vol. 1, November 1849, p. 542. (Colombia.)

Medium size; breast gray, sides heavily barred with black and white; back barred with white; nape red.

Description.—Length 170-200 mm. This species and *C. chrys-auchen* differ structurally from others of the genus found in Panamá in having the bare area around the eye more extensive. Adult male, forehead light yellow; crown and nape bright red; back, wings, and tail black, the back barred rather narrowly with white; wings barred or spotted with white, these markings in some including the wing coverts; central rectrices usually, and outer pair sometimes, barred with white; rump and upper tail coverts white; spot behind eye, space below, and malar region white; rest of side of head black; chin and throat pale grayish white; foreneck and upper breast olive-drab; lower breast, sides, flanks, and under tail coverts pale dull yellow, or white,

barred with black; under surface of wing and axillars dull black, barred with white.

Adult female, red of head restricted to nape; yellow of forehead extended to forecrown, anterior to its center, changing to black posteriorly; otherwise like male.

Immature male, lower foreneck and upper breast lightly barred with dull black; dark barring on sides and flanks dull black.

Immature female, like immature male, but with gray of center of crown indistinctly barred with black.

A male taken at the head of Río Guabal, northern Coclé, March 2, 1962, had the iris light brown; bill black; tarsus and toes yellowish neutral gray; claws black.

Measurements.—Males (23 from Panamá), wing 108.6-115.2 (111.4), tail 53.0-61.0 (56.7), culmen from base 26.5-28.8 (27.4), tarsus 19.5-21.8 (20.8) mm.

Females (10 from Panamá), wing 106.4-110.2 (107.8), tail 47.6-58.2 (52.9), culmen from base 24.2-27.5 (25.7), tarsus 19.0-20.1 (19.5) mm.

Resident. Common in forested areas in the tropical lowlands; on the Pacific slope from the eastern Canal Zone (Fort Clayton) and eastern Province of Panamá eastward through Darién, to 600 meters on Cerro Pirre; on the Caribbean side throughout from Costa Rica to Colombia.

While these are birds of the forest they range also in open stands of trees along the border of clearings, and on dead stubs and isolated trees. Once, at La Jagua I found one cutting a hole in a fence post in the open, marshy savanna, distant a kilometer from any forest cover. In the eastern San Blas I saw them occasionally in the extensive groves of coconut palms near Armila. They are most common in the more humid areas. The only record for the southern Canal Zone is near Fort Clayton. On the Pacific slope of the Cerro Azul I found them only on the forested hill at Camarón, north of Chepo. From Chimán eastward the birds are common, as they are throughout the Caribbean slope.

In general, this species suggests Wagler's woodpecker in calls and in flight. But, common as they are in many localities, they are less constantly seen because of the cover of leaves. Also they are less vociferous both in calling and in drumming, so that these activities do not bring them so constantly to notice. The flight is of the usual bounding type. Because of the short tail the birds appear rather heavy in the body when in the air.

In February and March I found them working at nesting holes, sometimes in the forest, and also regularly in trees standing in clearings. Some of the females collected in March were laying. I have not seen descriptions of the eggs. In early April, Chocó Indian women sometimes had fledglings as pets, in addition to many parakeets of similar age. On the Río Jaqué one of our Chocó neighbors fed a baby woodpecker on bits of cooked crayfish, which she chewed carefully and then offered to the chattering, begging bird in her fingers.

Stomachs of adults have held ants, a caterpillar, and other insects, and small seeds. They were seen frequently among the birds that came to eat drupes in feeding trees.

When Malherbe described this bird he attributed his specimen through error to Tobago, where the species does not occur. Hellmayr (Proc. Zool. Soc. London, 1911, p. 1188) designated Colombia as the type locality, where the species is found from Cauca northward through the Chocó, Córdoba, and northern Antioquia.

This woodpecker ranges north through Central America to southern México. The northern population from the latter area to northern Honduras differs in being slightly darker, with the breast and foreneck browner, and the chin and upper throat duller, very slightly paler than the lower foreneck. The white markings on the wings usually are more extensive, a character however that is variable as these markings disappear with wear. This northern group was separated by Todd as *C. p. perileucus*, with Manatee, British Honduras, as type locality. Birds of the population of the Panamanian range compared to a series from Colombia average faintly grayer, less yellowish on the lower surface, with the red area of the abdomen slightly paler, but with much variation from occasional individuals that are quite dark below, to others that are indistinguishable. This range of variation, more or less intermediate toward *perileucus*, continues through Costa Rica and Nicaragua.

**CENTURUS CHRYSAUCHEN (Salvin): Golden-naped Woodpecker,
Carpintero Nuca de Oro**

Melanerpes chrysauchen Salvin, Proc. Zool. Soc. London, November 1870, p. 213.
(Bugaba, Chiriquí, Panamá.)

Medium size; forehead and nape yellow; a broad white stripe down center of the back.

Description.—Length 170-195 mm. Adult male, forehead and hindneck yellow; crown red; back, scapulars, wings, and tail black; a broad white stripe down center of back; rump and upper tail coverts

white; secondaries barred and tipped with white; primaries lightly tipped with white, in some individuals also spotted lightly with white on the distal half; side of head behind eye and side of neck broadly black; lower foreneck and breast rather dark yellowish gray; chin and throat similar but somewhat paler; center of lower breast and abdomen scarlet-red; sides, flanks, and under tail coverts white, washed more or less with light olive-yellow, and barred with black; under wing coverts white barred with black; under surface of primaries, except at tip, and secondaries barred with white.

Adult female, like male, but with center of crown narrowly black; yellow of forehead extending over forecrown, and nape yellow like hindneck.

Immature, breast mottled or spotted faintly with darker color.

A female, taken near El Volcán, Chiriquí, March 18, 1965, had the iris mouse brown; base of gonys dull white; rest of bill black; tarsus and toes dull greenish gray, with the scutes bordered by white; claws dull black.

Measurements.—Males (10 from Chiriquí and Veraguas), wing 109.7-115.7 (112.8), tail 51.5-58.6 (55.7), culmen from base 25.1-28.3 (26.7, average of 9), tarsus 20.6-21.2 (20.9) mm.

Females (10 from Chiriquí, Veraguas, and Costa Rica), wing 106.8-115.7 (111.4), tail 50.0-59.4 (54.7, average of 9), culmen from base 23.4-26.7 (25.3), tarsus 19.6-21.2 (20.3) mm.

Resident. Locally common in western Chiriquí from near the sea to 1,280 meters on the western slopes of Volcán Barú.

In actions this species is similar in general to Wagler's woodpecker, but ranges more in forested areas. Near Santa Clara in western Chiriquí I found a group of half a dozen in the tops of tall trees over a coffee plantation, but it was more usual to encounter them in pairs or singly. Where forest growth has been cleared they range in scattered trees, living or dead, usually near the forest border, and also come into second growth. Near Puerto Armuelles, they were fairly common from near the sea to the hill country inland. Their calls are like those of Wagler's woodpecker, but somewhat louder, closely similar in fact to the notes of the red-bellied woodpecker of the southeastern United States. Near El Volcán I observed a mated pair at a nesting hole 10 meters from the ground in a dead stub at the border of a pasture.

Alexander Skutch (Auk, 1948, pp. 225-260) in a detailed study of this species in Costa Rica recorded that they are expert flycatchers of flying insects, in addition to the more usual fare of grubs and

beetles taken from the trunks and branches of trees. They come regularly to berry-laden trees, eat the tassels of the guarumo (*Cecropia*) trees, and were regular visitors to the ripe bananas and plantains that Dr. Skutch placed on his feeding stands for birds. In the hill region of El General, southwestern Costa Rica, he found them nesting from the end of March to June. Males and females at night slept together in old nesting holes, or in newer ones as soon as these had been dug to sufficient depth. When eggs were laid they alternated in covering them during the day, and at night both slept in the nest, in contrast to most other species of woodpeckers of this tropical area in which the male incubates alone at night. As the young hatch the pair continues this habit, and after the family is on the wing all return to the nest at dusk to spend the night in company. This may continue until the approach of the next nesting season. The birds rear one family each year, late nests apparently being those where the first setting of eggs has been lost. He recorded a predominance of males among them, as in 6 broods he noted 13 males and only 3 females. Details of egg size are not yet known. Near El Volcán, Chiriquí on March 16, 1955, I found a mated pair at a nest hole, apparently completed, 10 meters from the ground in a dead stub at the border of a pasture.

The species ranges beyond Panamá in southwestern Costa Rica to the Gulf of Nicoya. Peters (Check-list Birds World, vol. 6, 1948, p. 166) and other writers recently have listed *Centurus pulcher* (Sclater) of northern Colombia as a subspecies of *chrysauchen*, but after careful study this does not seem warranted. A series of 11 specimens of that bird collected by M. A. Carriker, Jr., in Antioquia, Bolívar, and Santander, differ in the male in having the entire crown except the narrow forehead red with only a scant trace of yellow at the base of the nape, instead of the extensive yellow of the fore-crown, occiput, and entire nape of *chrysauchen*. On the lower surface in both male and female the black and white barring extends to the upper center of the breast, forming a cross band well forward of the central area of red. In *pulcher* this pattern is restricted to the lower breast, and terminates barely above the upper end of the red. In the female *pulcher* the entire crown is black and the nape red with only a line of yellow below, while in female *chrysauchen* the black is confined to the narrow central area with most of the fore-crown and all of the nape yellow without red. The two undoubtedly are allied but differ so definitely, and are so widely separated geographically, that they appear specifically distinct.

**SPHYRAPICUS VARIUS VARIUS (Linnaeus): Yellow-bellied
Sapsucker, Carpintero Saucero**

Picus varius Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 176. (South Carolina.)

Of medium size; a broad, longitudinal white band on the wing; large black patch on the lower foreneck and upper breast.

Description.—Length 175-200 mm. Adult male, crown red, bordered by a narrow line of black, that begins at the base of the bill and extends back above the eye to join the broad black area of the side of the occiput and the upper nape; lower nape and upper hindneck white to dull brownish white; back and scapulars black spotted heavily and irregularly with white; rump and upper tail coverts white centrally, mixed with black at the sides; tail black; inner web of central pair of rectrices white barred with black; lateral rectrices with tips and sides edged with white; wings black; with the outer webs of the primaries and the distal area of the secondaries spotted heavily with white; middle and greater coverts extensively white, forming a broad, longitudinal stripe; side of the head black, with a broad white band from the nasal tufts back over the side of the head, and another of the same color from back of the eye to the side of the nape; throat and upper foreneck red, with the concealed bases of the feathers white; a large patch of black with a bluish sheen on lower foreneck and upper breast; sides brownish white lined irregularly with black; center of breast and abdomen light yellow; under tail coverts white; under wing coverts and axillars white, barred somewhat with slate.

Adult female, similar, but with chin and upper throat white, and crown varying from wholly red to wholly black.

Measurements.—Males (10 from Canada and northern United States), wing 122.1-127.9 (124.3), tail 68.2-74.6 (71.0), culmen from base 21.0-24.9 (23.4), tarsus 20.0-21.8 (20.9) mm.

Females (10 from Canada and northern United States), wing 120.7-127.0 (124.2), tail 64.2-75.5 (71.2), culmen from base 22.4-25.0 (23.7), tarsus 19.8-21.3 (20.4) mm.

Migrant from the north. Rare.

The species was recorded first in the Republic by Griscom who secured 1 on Cerro Flores in eastern Chiriquí in 1924. A female in the Museum of Comparative Zoology was taken by Benson on the ridge at Quiel, above Boquete, Chiriquí, November 3, 1931. My own collections include 2 females, 1 shot on Cerro Pando beyond El Volcán, Chiriquí, February 11, 1960. I had report of another seen near here at about this same time. The other specimen was taken on the Río Pequení, eastern Province of Panamá, near the

Candelaria Hydrographic Station, March 11, 1961. This individual had the body well encased in fat. Dr. and Mrs. Robert Scholes (Condor, 1954, p. 167) reported 1 seen at Summit Gardens, Canal Zone, December 17, 1950. Another sight record is by George V. N. Powell on Cerro Campana, western sector of the Province of Panamá, November 6, 1966.

This eastern subspecies of the yellow-bellied sapsucker nests from central Mackenzie and southern Labrador in northern Canada southward to the northern United States from South Dakota and Iowa eastward. In migration it is common through México, Guatemala, and El Salvador, mainly in mountain areas. A few range farther in Central America to reach a southern limit in central Panamá. They are fairly common also in winter in the Greater Antilles west to Hispaniola, with a few continuing farther to the Lesser Antilles beyond, to Guadeloupe, and Dominica; and to Aruba, Curaçao and Bonaire off the coast of South America. Thomas R. Howell (Auk, 1953, p. 119) after a survey of museum specimens points out the interesting fact that the majority of the migrants that come far south to México, Central America, and the West Indies are females.

In its northern range this species cuts series of holes in the trunks of several kinds of trees from which it drinks the sap, eats the soft cambium layer of the bark, and takes insects attracted to these cuttings.

The tongue, adapted to this method of feeding, differs from that of other woodpeckers in that it is only slightly extensible, and has the tip soft, with brushlike filaments. The method of feeding in the far southern migrants does not seem to be recorded. The two from Panamá that I have examined had eaten ants.

The Spanish name, *carpintero saucero*, cited for this species is the one given to it in México.

VENILIORNIS FUMIGATUS SANGUINOLENTUS (Sclater):
Smoky-brown Woodpecker, Carpintero Pardo

Chloronerpes sanguinolentus P. L. Sclater, Proc. Zool. Soc. London, pt. 27, 1859, p. 60, pl. 151. (Omoa, Honduras.)

Small; plain smoky brown throughout.

Description.—Length 150-170 mm. Inner hind toe small. Adult male, forehead and nasal tufts dark brown; feathers of crown and nape basally dark gray, tipped with red, with an indistinct subterminal bar of blackish brown; back and scapulars tawny-olivaceous, with a golden, sometimes orange-red, wash; rump and upper tail coverts

duller brown; tail blackish brown, with the outer rectrices paler, browner; wings brown, less tawny than the back, except the coverts, which vary toward the dorsal color; side of head including loreal area grayish brown; chin and upper throat gray, varying in depth of color; lower foreneck and upper breast dark brown; rest of under surface lighter, more tawny brown; under wing coverts grayish brown; inner webs of wing feathers with broad spots or bars of white.

Adult female, like male, but with crown feathers tipped with brown, the feathers being dusky basally.

Immature male, red of crown duller, usually restricted to distal two-thirds.

A female, taken on Cerro Malí, Darién, February 27, 1964, had the iris warm brown; maxilla, except area below the ridge above the nostril, and the distal end of the mandible, dull black; rest of maxilla and base of mandible neutral gray shading on the mandible through neutral gray to the darker color of the tip; tarsus and toes dull dark neutral gray; claws black.

Measurements.—Males (11 from Costa Rica, Chiriquí, and Veraguas), wing 84.7-89.9 (87.3), tail 45.6-55.3 (50.6, average of 10), culmen from base 20.7-24.2 (22.0), tarsus 16.9-18.8 (18.1) mm.

Females (9 from Costa Rica, Chiriquí, and Veraguas), wing 85.4-88.0 (85.8), tail 46.7-51.5 (49.1), culmen from base 19.0-23.2 (21.0), tarsus 17.1-18.1 (17.7) mm.

Resident. Rather rare in the upper Tropical and Subtropical Zones in mountain areas from western Chiriquí, across the divide into adjacent Bocas del Toro, and east to Veraguas; also on Cerro Tacarcuna, Darién (there somewhat intermediate toward nominate *fumigatus* of Colombia).

Most of the records for this little known bird have come from the western side of the great volcano west to the boundary with Costa Rica. There I have found it, usually in pairs, in the borders of clearings in the forest, and in shade trees over coffee plantations. The birds move quietly, and with their dull coloration are difficult to find. Rarely I heard one utter a low call, and occasionally my attention was drawn by their tapping as they moved over the trunks of the trees. They seem to prefer smaller tree trunks to larger ones, so that second growth—the rastrojo—is attractive.

Mrs. Davidson Terry collected the first specimens in this general area at Barriles, near the Río Chiriquí Viejo, in January 1931. Blake (*Fieldiana: Zool.*, vol. 36, 1958, p. 527) found only one in the

Mönniche collection, a bird taken at Peña Blanca at 1,900 meters, above Boquete. Bangs (Proc. New England Zool. Club, vol. 3, 1902, p. 34) recorded a male collected by W. W. Brown, Jr., at 2,130 meters elevation on the Caribbean slope of the volcano in Bocas del Toro, north of Boquete. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, pp. 439-440) list one taken by Arcé at Bugaba. Other specimens from Arcé are males reported by Salvin (Proc. Zool. Soc. London, 1867, p. 157, and 1870, p. 212) from the Cordillera de Tolé, Chiriquí, and Cordillera del Chucú, near Santa Fé, Veraguas, this being the eastern limit in western Panamá.

On the spur of Tacarcuna known as Cerro Malí, I found this woodpecker in small numbers through the rather open forest. My attention was drawn to them by their drumming, the usual rattle, but one extremely rapid, apparently near the maximum speed possible for this form of percussion. In skinning my only specimen I noted that the submaxillary gland was small as it measured only 8 mm. long by 2 mm. in diameter. As usual in this genus, feathers of the head were loosely attached so that many sloughed away in spite of care in skinning.

Earlier, the Harold Anthony party had taken 1 lower down at the old village site on the Río Tacarcuna at 575 meters, on March 27, 1915, and 2 on the eastern, Colombian slope of the mountain at the head of the Río Cutí, Chocó, on April 3 and 16, 1915.

As a species this woodpecker ranges in mountain areas from eastern México to western Panamá; and from eastern Darién across Colombia and Venezuela, south in the Andes to Bolivia and northwestern Argentina. The nominate race, widely distributed in the mountains of Colombia, is similar in color to *sanguinolentus* of Central America, but differs in larger size, as shown in the following tabulation.

Males (10 from Colombia), wing 92.3-100.4 (96.3), tail 49.6-54.6 (52.0), culmen from base 19.6-23.9 (21.9), tarsus 18.1-20.9 (19.1) mm.

Females (10 from Colombia), wing 93.0-101.0 (96.7), tail 46.6-57.1 (52.4), culmen from base 21.2-23.5 (22.2), tarsus 18.3-19.8 (19.1) mm.

In the few seen from Darién the wing in 3 males ranges from 88.7 to 91.7 mm., and in 1 female it is 90.3 mm. They show a tendency in size toward the Colombian group, but appear nearer *sanguinolentus*, in spite of their wide separation geographically.

VENILIORNIS KIRKII (Malherbe): Red-rumped Woodpecker,
Carpintero de Rabadilla Roja

FIGURE 74

Picus (Chloropicus) Kirkii Malherbe, Rev. Zool., November 1845, p. 400.
(Tobago.)

Small; under surface heavily barred with dark grayish brown and dull white; rump bright red.

Description.—Length 150-160 mm. Inner hind toe very small. Adult male, side of head, nasal tufts, and in some the forehead dull



FIGURE 74.—Red-rumped woodpecker, carpintero de rabadilla roja, *Veniliornis kirkii*.

brown; crown and hindneck dusky, the feathers tipped more or less broadly with bright red; a band of yellow across hindneck; back, scapulars, and wings tawny-olive, often tinged or washed with red; rump and upper tail coverts bright red; tail brown, the feathers dark, blacker centrally, the lateral pairs barred or spotted, often indistinctly, with dull white to brownish white; under surface dark grayish brown, barred narrowly with brownish white to grayish white; throat paler, usually with barring narrower; under surface of wing barred broadly with brownish white.

Adult female, crown and nape brownish black; band across hind-neck orange-yellow; otherwise like male.

Immature, duller colored above, more narrowly barred below; male with red spotting on crown reduced.

The species is one of wide distribution in northern South America with extension to the north into Darién, and an isolated group in western Panamá and southwestern Costa Rica. Two geographic races are found in the Republic of Panamá.

VENILIORNIS KIRKII NEGLECTUS Bangs

Veniliornis neglectus Bangs, Proc. New England Zool. Club, vol. 2, December 30, 1901, p. 99. (Divalá, Chiriquí, Panamá.)

Characters.—Dorsal surface browner; less reddish orange on back; side of head grayer; yellow of nape paler.

A female, collected near Puerto Armuelles, Chiriquí, had the iris wood brown; cutting edge of maxilla below nostril and the mandible, except the tip, dull greenish gray; rest of maxilla and tip of mandible fuscous-black; tarsus and toes dark neutral gray; claws fuscous with black tips.

Measurements.—Males (4 from Chiriquí), wing 82.5-86.8 (84.3), tail 49.9-54.7 (51.9), culmen from base 16.5-21.4 (19.9), tarsus 15.2-15.9 (15.6) mm.

Females (7 from Chiriquí), wing 80.2-84.5 (83.2), tail 46.7-49.9 (48.3), culmen from base 18.8-20.8 (19.8), tarsus 15.3-16.2 (15.8) mm.

Resident. Rare; found locally in small numbers in the lowlands of far western Chiriquí.

These inhabitants of forest seem never to have been abundant, and have become further restricted by clearing in their haunts. The race was first recorded in Panamá by Sclater (Proc. Zool. Soc. London, 1856, p. 143) from a pair collected by Bridges at David, these being the only ones seen. Arcé, according to Salvin, and Salvin and Godman, collected specimens at Bibalaz and Mina de Chorchá, Chiriquí, and at the Cordillera del Chucú and Calobre, Veraguas. Bangs (Auk, 1901, p. 360) recorded a female taken November 9, 1900, at Divalá, Chiriquí by W. W. Brown, Jr. There is a male in the California Academy of Sciences collected at Puerto Armuelles, Chiriquí, November 26, 1929, by Mrs. M. E. Davidson.

In 1960, on March 12 I secured 2 at Canta Gallo, below Alanje, Chiriquí, in the line of trees bordering the Río Escárrea. Near Puerto Armuelles from February 7 to March 9, 1966, I saw them

on several occasions. Seven were collected in the scattered stands of the former extensive woodland that still remain near the sea in the region called Olivo. They were found on trunks or limbs of trees, almost invariably in areas shaded by thick cover of leaves, where their dark colors and small size combined to make them difficult to see. Usually I located them by their steady pecking, and occasional rapid drumming. Aside from this, they moved quietly so that it was only occasionally that they came to my attention.

The limit of range for this subspecies is found in southwestern Costa Rica. As Slud (Bull. Amer. Mus. Nat. Hist., vol. 128, 1964) found it also on the Río Suab on the Caribbean slope it may range in western Bocas del Toro, as the Suab in Costa Rica is a tributary of the Río Yorkin, which forms the international boundary before it joins the Sixaola.

VENILIORNIS KIRKII CECILII (Malherbe)

Mesopicos Cecilii Malherbe, Rev. et Mag. Zool., ser. 2, vol. 1, November 1849, p. 538. (Colombia.)

Veniliornis kirkii darienensis Ridgway, Proc. Biol. Soc. Washington, vol. 24, February 24, 1911, p. 33. (El Real, Darién.)

Characters.—Dorsal surface brighter, more orange olive-brown, most individuals with considerable reddish orange wash on the back; side of the head lighter; yellow of nape deeper, more orange.

A male, taken at El Real, Darién, January 24, 1964, had the iris wood brown; maxilla fuscous; mandible pale dull neutral gray with a brownish cast; tarsus and toes dull greenish neutral gray; claws dusky neutral gray.

A female from Puerto Obaldía, San Blas, March 16, 1963, had the iris orange-brown; central ridge line of the culmen fuscous; base of maxilla below nostril and mandible dull light neutral gray; rest of maxilla pale mouse brown; tarsus, toes, and claws dark neutral gray.

Measurements.—Males (16 from Darién and northwestern Colombia), wing 81.7-86.7 (83.3), tail 46.1-54.6 (50.5), culmen from base 18.2-23.3 (20.4), tarsus 14.0-16.0 (15.4) mm.

Females (17 from Darién, San Blas, and northwestern Colombia), wing 79.5-85.2 (82.0), tail 46.2-51.0 (48.3), culmen from base 17.7-20.2 (19.3), tarsus 15.0-16.6 (15.6) mm.

Resident. Found locally in small numbers in the forested lowlands in Darién in the Tuira-Chucunaque Valley (El Real, mouth of Río Tuquesa, Boca de Paya), Garachiné, Jaqué, and Río Jaqué; to 550

meters on Cerro Pirre; on the Caribbean side in eastern San Blas (Permé, Puerto Obaldía); Isla Coiba.

This race, though not common, is widely distributed in the more humid forests of eastern Panamá. Usually I have located them through the sound of their industrious pecking, which may continue as steadily as that of some other small relatives, like the downy woodpecker of the north. Another sound that attracts attention is their drumming, a quick tattoo, made with great rapidity, slightly longer in duration than that of other woodpeckers of Panamá. Their low calls are heard less often. Occasionally I have seen 3 or 4 together, and less often have found 1 moving through the forest in company with roving bands of ant-wrens, small flycatchers, and tanagers. Nothing is recorded of their nesting.

In 1956 I was interested to find a few of these woodpeckers in the forests of Isla Coiba, usually in the wetter areas back of the mangrove swamps. The 3 taken include 2 adult and 1 immature bird. These agree closely in color with *cecilii* of Darién, rather than with *neglectus* of the adjacent mainland. They are slightly smaller and have a smaller bill, but in this are merely at the lower margin of the mainland series. Whether they should be recognized under a separate name requires more material for determination.

In most birds of this species the feathers of the crown are attached so loosely that in spite of careful manipulation a number usually are lost in the preparation of specimens.

In the description of the species under the name *kirkii*, Malherbe says merely that it is named for Kirk, without explanation. He gave the name *cecilii* in honor of Madame Cecile de Maillier. In his monograph of the woodpeckers published in 1862 he amended this to the feminine form *ceciliae*. The other spelling however has priority.

DENDROCOPOS VILLOUSUS EXTIMUS Bangs: Hairy Woodpecker,
Carpintero Velloso

Dendrocopus villosus extimus Bangs, Proc. New England Zool. Club, vol. 3, January 30, 1902, p. 33. (Boquete, Chiriquí, Panamá.)

Medium size; black above with a white or brownish white stripe down the back, and white lines over the eye and on the neck; under surface mainly brown.

Description.—Length 165-180 mm. Adult male, above black including the side of the head, malar stripe, and the central tail feathers; a red band across the back of the head; line over and around eye, and a band across hindneck, white to brownish white; a broad stripe down

the center of the back white anteriorly, changing gradually to brown at the lower end; outermost pair of rectrices light brown, next two pairs similar but black basally and on the inner webs; primaries and secondaries spotted with white; band on side of head below eye, and entire under surface brown; side of breast lined with black; under wing coverts white to pale brownish white.

Adult female, similar but without red on the head.

Immature male, posterior half of crown red, the feathers with rather indistinct subterminal bands of white.

Some individuals are distinctly paler, whiter on the lower surface.

A male taken on Volcán Barú, March 9, 1965, had the iris dark brown; side of maxilla below ridge in front of nostril and mandible, except tip, dull neutral gray; rest of maxilla and tip of mandible black; tarsus and toes dull brownish black; claws dark neutral gray.

Measurements.—Males (16 from western Chiriquí), wing 99.1-105.5 (102.0), tail 51.5-63.2 (58.8), culmen from base 21.5-27.0 (25.6), tarsus 19.0-21.1 (20.2) mm.

Females, (16 from western Chiriquí), wing 97.8-103.5 (100.5), tail 54.4-62.4 (58.8), culmen from base 21.4-24.2 (23.1), tarsus 19.1-20.5 (20.0) mm.

Resident. Fairly common in the mountains of western Chiriquí, from 1,500 to 2,100 meters elevation ranging east to Cerro Flores (Cerro Santiago) and north across the divide into southern Bocas del Toro.

Griscom (Bull. Mus. Comp. Zool., vol. 78, 1935, p. 331), through some misunderstanding, listed the range as extending into Veraguas, where to date this woodpecker is not known.

The hairy woodpecker in Panamá is found down into the Subtropical Zone, but is more common in the Temperate Zone. Here it lives regularly in areas where branches in the tall forest trees are lined with moss and epiphytes. The birds are encountered alone or in pairs, located sometimes through their steady hammering, by which they secure insects hidden in dead wood, sometimes through their calls, a sharp, single note, like that of the populations of the species in far northern forests. In this southern highland region the call was somewhat muted as it came to my ears in the cool, damp mountain air. Both males and females drum regularly as they do in the north.

The dark color of the under surface of these birds will be noticed immediately by northern naturalists, familiar with the clear white breasts of the species in their home areas. In any series the color of those from Panamá is somewhat variable as some individuals are

paler than the average. None, however, are wholly white as in the northern races.

To the north this race extends through the mountains of Costa Rica. A series from that country agrees in small size with the birds of Panamá. Skutch (Anim. Kingdom, 1956, p. 53) records this southern hairy woodpecker as similar to *Centurus rubicapillus* in its family arrangements, which indicates that male and female share in incubation during the day, with the male occupying the nest alone during the night.

CAMPEPHILUS GUATEMALENSIS GUATEMALENSIS
(Hartlaub): Flint-billed Woodpecker, Carpintero Picotero

FIGURE 75

Picus guatemalensis Hartlaub, Rev. Zool., vol. 7, June 1844, p. 214. (Guatemala.)
Campophilus guatemalensis buxans Bangs, Auk, vol. 18, no. 4, October 1901, p. 360. (Divalá, Chiriquí, Panamá.)

Large, crested; side of head red; distal half or all of bill yellowish white; under surface strongly barred with pale buff and black.

Description.—Length 305-335 mm. Outer hind toe longer than outer front toe; tenth, outermost, primary more than half the length of the wing. Adult male, entire head, including throat, bright red, with a small, sometimes indistinct auricular spot of grayish brown; upper surface, including hindneck and wings black except outer webs of the outer primaries which are dull brown above, and greenish olive-yellow on the under side; longer primaries tipped with dull white; tail dull brownish, with the under surface of the outer feathers dull olive-brown; a white or buffy white stripe on either side of the neck, extending down to the interscapular area, the two lines from either side converging at the center of the back; lower foreneck and upper breast black; rest of under surface light yellowish buff, barred rather narrowly with black; under surface of wing feathers at base light yellow; under wing coverts faintly paler, often with a hint of red on the edge of the wing.

Adult female, similar, but with the forehead, center of the crown and foreneck, except for the base of the chin, black.

Immature, male and female, like adult female but with the side of the head dull black, lined faintly with red. In an earlier stage the abdomen is plain buffy white without markings.

An adult male, collected near Almirante, Bocas del Toro, January 18, 1958, had the iris light cream-buff; bill Marguerite yellow; tarsus dull greenish gray. Another male, fully grown and in adult plumage,

but apparently less than a year old, taken near Puerto Armuelles, Chiriquí, March 13, 1966, had the iris light yellow; sides of maxilla and all of mandible very pale grayish white, becoming darker on base of mandibular rami; rest of maxilla pale brownish white, darker on the base of the culmen.

The distal half of the bill in most is distinctly light-colored, appearing quite yellow in birds in full plumage. In juvenile individuals the bill is darker, but not as deep in color as the slaty black of the juvenile *Campephilus melanoleucos malherbii*.

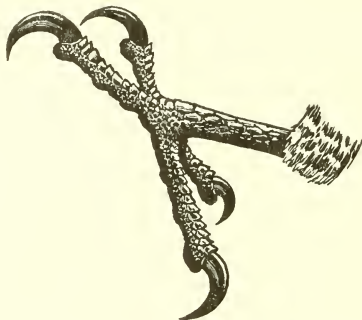


FIGURE 75.—Foot of flint-billed woodpecker, carpintero picotero, *Campephilus guatemalensis guatemalensis*, to show form of outer hind toe.

Measurements.—Males (10 from Chiriquí and Costa Rica), wing 179-189 (184.6), tail 87.8-103.9 (97.2), culmen from base 44.5-50.2 (48.0), tarsus 36.0-39.4 (37.8) mm.

Females, (10 from Chiriquí and Costa Rica), wing 181-190 (184.1), tail 93.1-104.4 (98.6), culmen from base 41.0-49.9 (45.8), tarsus 36.0-36.6 (36.2) mm.

Resident. Fairly common in forested areas in western Chiriquí from the tropical lowlands to 1,350 meters on Cerro Pando, and to 1,600 meters above Boquete; in western Bocas del Toro east along the shores of the Laguna de Chiriquí to the Río Guarumo (Chiriquicito); to 750 meters on the Río Changuena. On both slopes it ranges west to the Costa Rican boundary.

The report by Salvin (Proc. Zool. Soc. London, 1867, p. 157), quoted in Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, p. 447), of a specimen taken by Arcé at "Santiago de Veragua" must have been an error as the species is unknown that far to the east.

These are forest birds that range from heavy, unbroken woodland to more open stands where scattered dead trees remain in pasturelands. They come also into second growth when this has attained good size. To this extent they appear adaptable, but are not found when clearing is too complete. Shade trees standing over coffee are frequent haunts.

On several occasions I have found a pair accompanied by one nearly grown immature bird, possible indication of a restricted rate of reproduction. I have seen nothing of their nesting other than holes of the usual form that they have cut in trees. Often pairs have scolded me with chattering calls, and regularly I have heard their curious drumming, a loud single stroke, followed immediately by another, rarely by two, of lesser force. In feeding they work regularly in cutting holes in dead trunks, and in flaking off dead bark in search of insects, sometimes high above the ground, less frequently on low stumps. They are encountered often in the same areas as *Dryocopus lineatus*, the lineated woodpecker, the two species feeding without apparent competition. The flint-billed woodpecker, like the following related species, Malherbe's woodpecker, is strong of body, with tough, thick skin that in preparation of specimens must be loosened by a knife. The large head has to be cleaned through an incision in the nape. In closing this, force is required to pass a needle through the skin. The narrow salivary glands that open in the base of the front of the mouth below the tongue, extend back on either side for a distance of 25 mm., being about 2 mm. wide. They are smaller and shorter than those of *Dryocopus lineatus*, and have a less abundant secretion.

Current treatment usually segregates these woodpeckers, the related large species, *melanoleucus* and *haematogaster* of Panamá, and others of extralimital range, in the genus *Phloeoceastes*. On careful comparison I find no structural characters on which this group may be separated from others placed in the genus *Campephilus*.

The typical race of *C. guatemalensis* ranges north from its limit in western Panamá through Central America to eastern and southern México. A closely allied subspecies, *C. g. regius*, slightly larger in size and somewhat whiter on the lower surface, is found from southern Tamaulipas and San Luis Potosí to Veracruz and northeastern Oaxaca. *C. g. nelsoni* of western México is about equal in size to *guatemalensis* (some are slightly smaller), has the black of the breast more extensive, and is still whiter below.

The English name, flint-billed woodpecker, suggested by Sutton (Mexican Birds, 1951, p. 108), seems appropriate to distinguish this species from others of the group.

CAMPEPHILUS MELANOLEUCOS MALHERBII G. R. Gray:
Malherbe's Woodpecker, Carpintero Real Barbinegro

Campephilus malherbii G. R. Gray, Gen. Birds, vol. 2, 1845, [p. 436], pl. 108.
(Bogotá, Colombia.)

Large, crested; male with a prominent white spot at the base of the bill; female with a broad white band on the side of the head; bill dark, in life appearing nearly black; under surface strongly barred with buff and black.

Description.—Length 330-360 mm. Outer hind toe longer than outer front toe; tenth, outermost, primary more than half the total length of the wing. Adult male, nasal tufts, anterior lores, and spot on side of base of mandible white to pale yellow; spot on side of head over auricular area with upper half black, lower half white; in most individuals a narrow black line across forehead (faint or absent in some); rest of head, including cheeks and crest bright red (the concealed bases of the feathers white); hindneck, back, scapulars, and wing coverts black; wings, rump, upper tail coverts, and tail brownish black; outer webs and tips of primaries edged with dull white; a conspicuous stripe on either side of hindneck and upper back white; entire foreneck, sides of neck, and upper breast black; rest of under surface pale cinnamon-buff to tawny, broadly barred with black; edge of wing, under tail coverts, and inner webs of primaries and secondaries pale yellow to yellowish white.

Adult female, forecrown, center of crest, and sides of head black, except for a broad white stripe on lower portion, and a narrower white line behind the eye and on the side of the nape.

Juvenile male, like female, but with side of the head red (the feathers black basally), and black of the crown less in extent; red of head paler.

Juvenile female, like adult but with red of head paler.

A male taken on the Río Boquerón, near the Peluca Hydrographic Station, Panamá, February 25, 1961, had the iris honey yellow; bill dark neutral gray, except for the base of the maxilla below and a little forward of the nostrils, and the upper half of the base of the mandible, which shade into paler neutral gray; tarsus and toes pale greenish slate; claws dark neutral gray.

A female, taken with the male described above was similar to its companion. Another female, collected along the Río Guánico, near Las Palmitas, Los Santos, January 26, 1962, had the iris bright yellow; bare skin around the eye fuscous, with faint, indefinite grayish reticulations; base of maxilla below level of nostril, and basal

half of mandible, dull pale mouse brown; rest of bill brownish neutral gray; tarsus and toes brownish neutral gray; claws darker brown.

Measurements.—Males (15 from Panamá), wing 181-187 (184.0), tail 100.0-117.2 (109.2), culmen from base 43.6-51.9 (46.9), tarsus 36.0-38.6 (36.9) mm.

Females (14 from Panamá), wing 181-188 (184.0), tail 102.5-115.1 (109.0), culmen from base 41.2-47.8 (43.5), tarsus 35.1-36.9 (36.1) mm.

Feathers of the tail, and to a lesser degree the primaries, in many individuals are worn and often have the tips broken.

Resident. Fairly common in lowland forests from eastern Chiriquí (Cerro Chame, San Félix) and central Bocas del Toro (Cricamola, on the eastern shore of the Laguna de Chiriquí), east on the Pacific and Caribbean slopes to the Colombian boundary; recorded to 900 meters on Cerro Chame, Chiriquí, and on the base of Cerro Tacarcuna (La Laguna), Darién; to 550 meters on Cerro Pirre, Darién.

These are forest woodpeckers in the main that now are found most often in the eastern half of the Republic wherever there is suitable cover for them. Probably they were more common formerly in Veraguas and eastern Chiriquí when there were more extensive forests in that area than at present when so much of the land has been cleared. The earliest report for Chiriquí is a specimen listed by Hargitt (Cat. Birds Brit. Mus., vol. 18, 1890, p. 473) as from "Chiriquí, Veragua. Cpts. Kellett & Wood." This was obtained during the survey voyage of *H. M. S. Herald*, presumably collected by the naturalist Berthold Seemann. Salvin (Proc. Zool. Soc. London, 1867, p. 157) records a specimen sent by Arcé from the Cordillera de Tolé, the first from the province with a definite locality. Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, p. 448) list this record, but through an oversight state on the same page that "Arcé sent no specimens from Chiriquí." The next locality records are those of Mrs. Davidson (Proc. California Acad. Sci., vol. 23, 1938, p. 257) who secured specimens near San Félix in December 1931, and on Cerro Chame on January 12, 1932. I collected the male of a pair in a small tract of forest at the hot springs in the valley of the Río Dupí about 10 kilometers west of San Félix on February 18, 1956. On the Caribbean side Peters (Bull. Mus. Comp. Zool., vol. 71, 1931, p. 319) recorded 1 taken by Hasso von Wedel at Cricamola, Bocas del Toro, near the eastern end of the Laguna de Chiriquí as the most western point at which the bird was known. None have been recorded on the offshore islands.

On the eastern side of the Azuero Peninsula I found scattered pairs in stands of trees back of the shore line, often in swampy localities. At Alvina, below Parita, where the manzanillo (*Hippomane mancinella*), with its irritant, milky sap was prevalent in the scrub border back of the beach, the birds ranged through these trees as they did in others, though I did not see the woodpeckers boring in the trunks or branches of the poisonous species. Although they are forest birds in the main, they come out also into trees standing in clearings. Generally they are encountered in pairs that frequently move about in close company, often displaying to one another with rapid movements of the head, accompanied by repetitions of their usual note *chis seck, chis seck*. In crossing open areas the flight is strongly undulating.

The drumming, heard regularly, is a single strong blow followed by other strokes, two to several in number, made rather slowly, and with less force. Occasionally I saw them at nesting holes, well elevated in dead branches or stubs. On Barro Colorado Island in the Canal Zone they have been reported as breeding from December to February. Chapman recorded that young left a nest on February 20, 1925. Goldman collected a juvenile bird on the Río Gatun in the Canal Zone on January 24, 1911. I have seen no record of the eggs.

The tongue in this species has a short, narrow, sharp tip that forms a stiffened spear point. The salivary glands are small, short, and of slight development. Stomachs that I have examined have held beetle larvae, evidently of wood-boring species. In one I noted small bits of wood, evidently taken with the food.

These are strong, heavily muscled birds, with the skin so closely attached to the body that in preparation of specimens it has to be detached inch by inch, often with use of the scalpel. In spite of this, on the Río Jaqué I saw one killed and eaten by a Chocó Indian family.

Beyond Panamá to the south this subspecies extends across northern Colombia to northwestern Venezuela. There is some variation in size, as indicated by length of wing, but from material available this appears to be individual.

The bird was named for Alfred Malherbe in recognition of his studies of the woodpeckers. Other races recognized in this species in the area from southern Colombia, southern Venezuela, and the Guianas southward all have lighter colored bills.

CAMPEPHILUS HAEMATOGASTER SPLENDENS Hargitt:
Crimson-bellied Woodpecker, Carpintero Real Carminoso

Campophilus splendens Hargitt, Ibis, ser. 6, vol. 1, January 1889, p. 58. (Puerto Valdivia, Antioquia, Colombia.)

Large; crown and lower back red; upper back and wings black.

Description.—Length 285-345 mm. Tenth, outermost, primary long and broad. Adult male, crown except forehead, crest, and neck red; lower back and rump also red with the feathers basally barred with white and black; upper back, wings, and tail somewhat bronzy black; a broad band of black from the forehead across the side of the head through the eyes, bordered narrowly with buff above the auricular region; below this a broad line of buff to white from the base of the nostrils to below the auricular region; chin, upper throat, and feathers on base of mandible black, the latter area with a central spot of red; lower foreneck and upper breast red; rest of breast, abdomen, and sides tipped with red, the feathers basally dusky, barred narrowly with buff; under tail coverts black, tipped with red; under wing coverts, axillars, and broad spots on inner webs of remiges yellowish buff.

Adult female, like male, but forecrown somewhat mixed with black, and entire foreneck black; the broad buff band on the side of the head extended down the sides of the neck.

Juvenile, dull blackish brown on lower surface, with the bases of the feathers more narrowly barred.

An adult female, taken on Cerro Tacarcuna, Darién, February 28, 1964, had the iris reddish brown; bare skin around the eye dull black; bill black; tarsus and toes fuscous-black; claws black.

Measurements.—Males (10 from Darién and northwestern Colombia), wing 178-187 (183.1), tail 90.5-102.7 (96.9), culmen from base 45.5-51.0 (48.0), tarsus 35.5-37.8 (36.9) mm.

Females (10 from Darién and northwestern Colombia), wing 176-187 (181.7), tail 89.3-103.4 (96.2), culmen from base 44.1-50.1 (46.6), tarsus 35.9-37.9 (37.0) mm.

Resident. Rather rare in heavy forest in Darién, from the lowlands to 1,580 meters on Cerro Pirre, and 1,450 meters on Cerro Tacarcuna; recorded also on the Caribbean slope from Bocas del Toro at Buena Vista on the old Boquete Trail, and the lowland shores of Laguna de Chiriquí; from Calovévora, northern Veraguas; also from the Río Boquerón near Peluca Hydrographic Station, eastern Prov-

ince of Panamá (sight record); and from Armila and Puerto Obaldía, San Blas.

An early report by Salvin (Proc. Zool. Soc. London, 1867, p. 157) for "Santiago de Veragua" cited also by Salvin and Godman (Biol. Centr.-Amer., Aves, vol. 2, 1895, p. 445) seems to have been corrected by Salvin (Proc. Zool. Soc. London, 1870, p. 212) to Calovévora. The species is known on the Pacific slope only from Darién.

The little known crimson-bellied woodpecker is one that I have encountered on few occasions. In the Tuira Valley near the mouth of the Río Paya, on March 3, 1959, I found a pair with 1 grown young in an area of heavy forest. Here the birds ranged rather low through the trees, among the lower branches or below and in the tops of taller undergrowth. My view of them was of occasional brief glimpses as they flew with bounding flight to disappear behind the cover of leaves. It was difficult to follow them, and still more difficult to observe them, as they often rested quietly. As they moved about occasionally they uttered low, chattering calls. In flight they appeared dark—almost black—except for an occasional flash of light color from the bars and spots on the under surface of the wings. Elsewhere, in more open forest in eastern San Blas, on Cerro Pirre, and on Cerro Tacarcuna, they were seen in the higher levels of the trees. In mannerisms in general they are like the two other large species of the genus found in Panamá. The drum resembles these also, being a single strong blow, followed immediately by another, usually of equal force. The low, rattling call is similar to that of *C. m. malherbii*. One caught in a mist net squealed loudly.

The submaxillary glands in an adult female measured 10 mm. long by 2 mm. wide. They lay closely applied to the inside of the ramus of the lower jaw on either side. Stomachs of those that I examined have held remains of large weevils and other adult beetles, and bits of large coleopterous larvae, evidently boring species. One of these, apparently a longicorn, was 75 mm. long and from the skin must have been two-thirds as thick as my little finger. Another was 150 mm. long with the diameter of my fountain pen.

The record for the Río Boquerón was made by Enrique van Horn, an experienced and knowledgeable woodsman, of the staff of the Gorgas Memorial Laboratory, who was with me as an assistant.

The rather long, flexible body plumage of these birds soon becomes worn so that most present an untidy appearance.

The present subspecies ranges in Colombia east to the middle Magdalena Valley and south to northwestern Ecuador. Typical *C. h.*

haematogaster, in which the foreneck is wholly black, and the under wing markings are whiter, is found in eastern Colombia from Boyacá southward through eastern Ecuador to eastern Perú.

The peculiar signal drum of the three species of *Campephilus* found in Panamá, a single hard blow of the bill followed instantly by a second, appears to be common to others of this genus. In earlier observations in the Chaco of northern Argentina I noted it in *Campephilus leucopogon* (Wetmore, U.S. Nat. Mus. Bull. 133, 1926, p. 215), and it is described by Tanner (Nat. Aud. Soc., Res. Rep. no. 1, 1942, p. 62) in the ivory-billed woodpecker, *Campephilus principalis*, formerly found through southeastern United States.

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Corrigenda
to
The Birds of the Republic of Panamá, Part 1

- Page 151, line 10. In measurements of female, add "culmen from base 30.8-34.2 (32.0)"
- Page 188, line 8. Delete period after *Azteca*
- Page 229, line 17. Delete "base of bill and cere gray"
- Page 366, line 3. In the account of the Family Heliornithidae, after "webbed" add "at base with the distal joints of the toes lobed,"
- Page 403, Figure 67. The legend should read: Solitary sandpiper, playerito solitario, *Tringa solitaria*.

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